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NOT TO BE TAKEN AWAY.

THE FAUNA OF BRITISH INDIA,

INCLUDING

CEYLON AND BURMA.

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FISHES.—Vol. II.

BY

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PREFACE.

That part of the 'Fauna of British India' which relates to Fishes is completed by the publication of the present volume. Unhappily the author of the work has not lived to see it appear; the illness that, in the Introduction to the first volume, was noticed as having prevented his correcting the proofs, terminated fatally almost on the day when that volume was issued.

Indian naturalists will not soon forget the great additions made by Dr. Francis Day to our knowledge of Indian fishes, and they will assuredly join the Editor of the present series in deploring the loss of one who, by the researches of a life-time, by his numerous published works, and by admirable figures, has rendered such signal service to Indian Zoology.

The Editor has found it necessary in this second volume and in part of the first, for the sake of saving space, to make some slight excisions in the text, and to recast in many cases the synopses of genera and species. As the author was unable to revise the proofs, it is hoped that some allowance

will be made should any defects have crept in and passed unnoticed.

An explanation of the abbreviations used and of some of the technical terms has been given at the commencement of the first volume.

The remaining parts of the 'Fauna of British India,' dealing with other classes of Vertebrata, are well advanced towards completion, and it is hoped that a volume of Birds by Mr. E. W. Oates will be published before the close of the year.

July, 1889.

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Subclass **TELEOSTEI** (*continued*).

Order ACANTHOPTERYGII (*continued*).

Family II. SQUAMIPINNES.

Chætodontidæ, pt., Richardson.

Pseudobranchiæ well developed. Body elevated and compressed. Mouth generally small, and situated in front of snout. Teeth villiform or setiform, neither incisors nor canines; in most of the genera the palate is edentulous. Soft portion of the dorsal fin of greater extent than the spinous; anal with three or four spines; lower pectoral rays branched; ventrals thoracic, 1/5. Scales cycloid or very finely ctenoid, extending to a greater or less extent over the vertical fins. Air-bladder present, generally simple. Intestines usually much convoluted; stomach cæcal. Pyloric appendages in moderate numbers.

Geographical Distribution. These fishes are, as a rule, marine and tropical. Some are taken in rivers and estuaries, but very few are captured above tidal reach.

Synopsis of Indian Genera.

First group. CHÆTODONTINA.

No palatine or vomerine teeth.

A. Dorsal spines not separated from rays by a hollow or notch.
  a. No preopercular spine.
    Snout moderate or short; no elongate dorsal spine .... 1. CHÆTODON.
    Snout much prolonged .... 2. CHELMON.
    Snout moderate, 4th dorsal spine elongate .... 3. HENIOCHUS.
    Snout moderate, 3rd dorsal spine elongate .... 4. ZANCLUS.
  b. A strong preopercular spine .... 5. HOLACANTHUS.
B. A notch or hollow between spines and rays of dorsal.
  a. Pectorals short.
    No dorsal spines with filiform extremities .... 6. SCATOPHAGUS.
    Several dorsal spines elongate and filiform .... 7. EPHIPPUS.
  b. Pectorals very long, nearly reaching caudal .. 8. DREPANE.

Second group. TOXOTINA.

Vomerine and palatine teeth.

Body oblong; dorsal in posterior half .... 9. TOXOTES.

First group. CHÆTODONTINA.

1. Genus CHÆTODON, Linn.

Syn. *Rabdophorus* and *Microcanthus*, Swains.; *Megaprotodon*, Guich.; *Sarothodus*, Gill.

Branchiostegals six. Body elevated and strongly compressed. Snout of moderate length, or short. Preopercle entire, or slightly serrated. Palate edentulous. Spinous and soft portions of the dorsal fin not separated by a notch, the rays more numerous than the spines, none of the latter elongate; anal with three or four spines. Scales of large, moderate, or small size. Lateral line continuous, sometimes incomplete. Air-bladder may be constricted or with horns. Intestines much convoluted.*

Geographical Distribution. Tropical seas.

Synopsis of Indian Species.

A. Anal spines 4; a black eye-band and a caudal ocellus .... 1. *C. plebeius*, p. 3.
B. Anal spines 3; more than 10 dorsal spines.
- *a.* No vertical band through eye ...... 2. *C. xanthocephalus*, p. 3.
- *b.* A black or dark vertical eye-band.
  - *a′.* Two large black spots on back; narrow vertical lines on sides .. 3. *C. falcula*, p. 4.
  - *b′.* Black lines on sides, descending obliquely forwards in front, backwards behind, the two not crossing. No ocellus on soft dorsal, no dorsal ray produced .... 4. *C. vagabundus*, p. 4.

---

* Genus THOLICHTHYS, Günther.

Dr. Günther (A. M. N. H. ser. 4, i, 1868, p. 457) described and figured a very small fish, 11 millim. long, as a new *Cyttoid* genus, which he termed *Tholichthys*. I obtained several (I think thirteen) larger specimens at Madras $1\frac{1}{10}$ inches long, which I described (P. Z. S. 1870, p. 687) as *T. osseus*. One was figured in the 'Fishes of India,' pl. xxvi, fig. 2. The following is the description; the fish appears to me to belong to the *Squamipennes*.

D. 12/25. P. 15. V. 1/5. A. 3/19–20. C. 17. L. l. 41.

Length of head nearly 3, height of body 2 in the total length. *Eyes*—diameter from 2 to $2\frac{1}{2}$ in the length of head. The angle of the preopercle is much enlarged, reaching to almost below the origin of the pectoral fin; the shoulder scale and those over the shoulder-girdle considerably dilated. *Fins*—third dorsal spine the longest and strongest, the fin notched; ventrals rounded; caudal almost square. *Scales*—ctenoid. *Lateral line*—ceases opposite the end of the soft dorsal.

In the very young, as figured by Dr. Günther, the developments mentioned above are greatly magnified, showing that atrophy occurs as age advances.

An ocellus on soft dorsal; 5th dorsal ray produced .... 5. *C. auriga*, p. 5.
c'. Black stripes on sides vertical above, bent back below .... 6. *C. chrysurus*, p. 6.
d'. Sides uniform brown............ 7. *C. kleinii*, p. 6.
e'. Each scale on side with a central brown spot .... 8. *C. miliaris*, p. 7.
f'. Head with three dark bands, sides striped longitudinally .... 9. *C. trifasciatus*, p. 7.
g'. A black blotch on side, just above l.l. 10. *C. unimaculatus*, p. 7.
h'. A white collar behind the broad eye-band .... 11. *C. collaris*, p. 8.
i'. Four dark vertical bands, the ocular being one .... 12. *C. fasciatus*, p. 8.
j'. A black longitudinal line on each row of scales, and an interrupted band on root of tail............ 13. *C. melanotus*, p. 9.
k'. Six dark vertical bands on sides .. 14. *C. octofasciatus*, p. 9.
C. Anal spines 3; dorsal 6 or 7, vertical dark bands .... 15. *C. ocellatus*, p. 10.

725. (1.) Chætodon plebeius.

Chætodon plebeius, *Brouss. MS.*; *Cuv. & Val.* vii, p. 68; *Day, Fish. India*, p 104, pl. xxvi, fig. 3 (see synon.).

D. 14/13–17. P. 15. A. 3/15–16. C. 17. L. l. 50. L. tr. 7/15.

Length of head 4, height of body nearly 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 from end of snout. Preopercle finely serrated. *Fins*—dorsal spines strong, the fourth slightly the longest, the soft portions of the dorsal and anal rounded; second anal spine longest and strongest; caudal slightly rounded. *Colour*—yellow, with a black white-edged ocular band, a black white-edged ocellus at base of caudal fin.

Hab. Andaman Islands to the South Seas.

726. (2.) Chætodon xanthocephalus.

Chætodon xanthocephalus, *Bennett, P. Z. S.* 1832, p. 182; *Day, Fish. India*, p. 104, pl. xxvi, fig. 4.

D. 13–14/25–27. P. 15. A. 3/24. C. 17. L. r. 46/44. L. tr. 11/18.

Length of head $4\frac{1}{3}$, height of head $1\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{2}$ from end of snout and apart. Preopercle indistinctly serrated. *Fins*—soft portions of dorsal and anal rounded. *Colour*—a small dark blotch above orbit; no ocular band; body brownish yellow, with six indistinct dark vertical streaks; dorsal and anal fins dark violet, having white edges; caudal and ventrals yellowish.

Hab. Ceylon and Zanzibar.

727. (3.) Chætodon falcula.

Chætodon falcula, *Bloch, Ich.* ix, p. 102, t. 426, fig. 2; *Day, Fish. India,* p. 104, pl. xxvi, fig. 5 (from a drawing).

D. 12–13/(24) 26–27. A. 3/22–23. L. r. 28. L. tr. 6/12.

Length of head $3\frac{1}{3}$ to 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, nearly 2 from end of snout, and 1 apart. Snout produced, pointed. Preopercle serrated. *Fins*—last dorsal spine longest; soft portion of fin rounded; caudal almost square; ventral reaching as far as anal; pectoral equal to the length of the head behind the angle of the mouth; second anal spine strongest and rather the longest, equal to last dorsal. *Colour*—body and head of a rather reddish lilac-purple, becoming primrose posteriorly and on the fins. A dark white-edged ocular band, narrower than the orbit, commences before the dorsal fin, and is continued through the eye on to the interopercle. A black band, widest above, from the first 4 or 5 dorsal spines to below the lateral line; a second, angularly pointed in front, from last three spines to lateral line; a third over free portion of tail; these bands, which are triangular in the young, descend down on the body in adults. Twelve to fourteen vertical narrow black bands on each side. Soft dorsal with a narrow black margin; caudal with a black and white posterior edge; anal with a white outer margin, a black intramarginal band, and two more bands parallel to it.

Hab. Seas of India to the Malay Archipelago, and beyond. This species attains to at least 8 inches in length.

728. (4.) Chætodon vagabundus. (Fig. 1.)

Chætodon vagabundus, *Linn. Syst Nat.* i, p. 465; *Day, Fish. India,* pp. 105, pl. xxvii, fig. 1, *Suppl.* p. 786 (see synon.).

Chætodon pictus, *Forsk. Descr. Anim.* p. 65, no. 92; *Day, t. c.* p. 105, pl. xxvi, fig. 6 (see synon.).

Pah-noo-dah, Andam.; *Chánd,* Maráthi.

D. 12–13/23–25. A. 3/20–22. C. 17. L. r. 43/33. L. tr. 5–6/15.

Length of head about $3\frac{1}{2}$ to 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and also apart. Snout rather produced and pointed. Preopercle finely serrated, most strongly so at its angle. *Fins*—dorsal spines moderate; soft portions of dorsal and anal obtusely angular; second anal spine equals the length of the third; caudal rounded. *Colour*—a black white-edged ocular band descends to the angle of the interopercle. Numerous parallel dark bands pass obliquely downwards and forwards from the back, from the lowest of these other similar bands run obliquely backwards. A black band commences on the dorsal spines, and, growing broader, curves downwards over the soft dorsal, root of tail, and part of anal.

Dorsal and anal fins margined with black. Two black vertical bands on the caudal, the anterior of which is lunate.

The variety *C. pictus* has a black band on the snout, the dark ocular band descending to the chest, all the posterior third of the body with the soft dorsal and anal black; tail light with two black bands, the anterior lunate; fine dark oblique lines from the dorsal

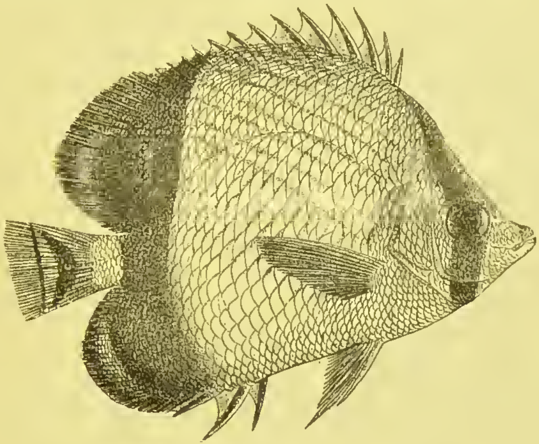

Fig. 1.—*Chætodon vagabundus* var. *pictus.*

fin directed forwards and downwards and others on the lower and hinder half of each side directed backwards and downwards; the two not crossing.

ab. Red Sea, those of India to the Malay Archipelago and Polynesia; attaining at least 10 inches in length.

729. (5.) Chætodon auriga.

Chætodon auriga, *Forsk. Descr. Anim.* p. 60, no. 81; *Day, Fish. India,* p. 106, pl. xxvii, fig. 3 (var. setifer) (see synon.).

D. 11–13/23–24. P.15. A. 3/20–21. L. r. 44–39. L. tr. $3\frac{1}{2}$–$4\frac{1}{2}$/13.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $1\frac{3}{4}$ to 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, nearly $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout pointed. Preopercle very finely serrated. *Fins*—5th dorsal ray produced into a short filament, soft portions of dorsal and anal angular; third anal spine the longest; caudal slightly emarginate. *Colour*—a brown band, with a white anterior edge, passes through the orbit and over the interopercle. Body with darkish lines, passing upwards and backwards in the anterior third of the body, and downwards and backwards posteriorly. A darkish band from base of soft dorsal across free portion of tail to lower half of anal. A dark band through middle of anal. Dorsal, anal, and caudal edged with white. In the variety *C. setifer* the ocular band, which has white

edges, is wider below the orbit. A dark ocellus on the centre of the middle dorsal rays. Anal with a fine black intramarginal band having a white outer edge, upper and hind margins of the anal edged with black; on the caudal fin two fine vertical lines enclose a semilunar space.

Hab. From the Red Sea, through the seas of India to Polynesia.

730. (6.) Chætodon chrysurus.

Chætodon chrysurus, *Desjardins, P. Z. S.* 1833, p. 117.
Chætodon Mertensii, *Day, Fish. India*, pp. 105, 747, pl. xxvii, fig. 2 (scales too small) (see synon.).

D. 13/22–23. P. 15. A. 3/16. C. 17. L. r. 34/27. L. tr. 5/14.

Length of head $4\frac{1}{3}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of the head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercle entire, its angle very oblique. *Fins*—dorsal spines increasing in length to the fifth, the soft portion of the fin as high as the spinous and rounded posteriorly; caudal cut nearly square; anal spines long, the third rather the longest, exceeding the highest of the dorsal by nearly one fourth. *Colour*—head and anterior two thirds of the body lavender, posterior third yellow; interorbital space yellow; a narrow dark white-edged band commences a little in front of the dorsal fin, then ceases, but reappears a little above the eye, through which it descends and passes down the preopercle to a little in front of the angle. Anterior two thirds of the body with narrow black vertical bands, which at the middle of the body form an angle directed forwards. A narrow dark intramarginal line with a white outer edge on both dorsal and anal fins; a narrow dark vertical band in the last third of the caudal, followed by a rather wider yellow one, externally the fin is grey.

Hab. Red Sea, Mauritius, the Malay Archipelago, and Pacific. I have this species from Ceylon.

731. (7.) Chætodon kleinii.

Chætodon kleinii, *Bloch, Ich.* t. 218, fig. 2; *Day, Fish. India*, p. 106.

D. 13/22–25. P. 15. A. 3/18–20. C. 17. L. l. 33. L. tr. 5/11.

Length of head $4\frac{1}{3}$, height of body nearly 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Preopercle entire. *Fins*—dorsal spines increasing in length to fifth, soft portion of fin rounded and rather higher than the spinous; caudal rounded; second and third anal spines of about equal strength, their length about equal to the fifth dorsal. *Colour*—uniform brownish, becoming darkest posteriorly; a rather broad ocular band from in front of the dorsal fin, through the eye over the pre- and interopercles to the base of the ventral fin; a black band over the snout. Ventrals black; edges of the soft dorsal, anal, and caudal black.

Hab. Seas of India to the Malay Archipelago.

732. (8.) Chætodon miliaris.

Chætodon miliaris, *Quoy & Gaim. Voy. Uranie et Phys.* p. 380, pl. lxii, fig. 6.
Chætodon guttatissimus, *Bennett, P. Z. S.* 1832, p. 183; *Day, Fish. India*, pp. 106, 747, pl. xxvii, fig. 4, *Suppl.* p. 786 (see synon.).

D. 13/22. P. 15. A. 3/17–18. C. 19. L. l. 38. L. r. 42/35.

Length of head $4\frac{1}{4}$, height of body 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Preopercle serrated. *Fins*—soft portions of dorsal and anal rounded posteriorly. *Colour*—a brown white-edged ocular band one third the width of the eye passes from nape to lower edge of interopercle. Body yellow, each scale having a brown spot; dorsal and anal fins with an outer narrow black edge and a broader white outer band, followed externally by a yellow margin; the rest of the fins covered with fine dark brown spots; caudal yellow, with a black vertical band.

Hab. Ceylon, Zanzibar, and Red Sea.

733. (9.) Chætodon trifasciatus.

Chætodon trifasciatus, *Mungo Park, Trans. Linn. Soc.* iii, p. 34.
Chætodon vittatus, *Bl. Schn. Syst. Ich.* p. 227; *Day, Fish. India*, pp. 107, 747, pl. xxvii, fig. 5, *Suppl.* p. 786 (see synon.).

D. 13/21–22. A. 3/(18) 20. C. 18. L. r. 45/38. L. tr. 5/13.

Length of head 4 to $4\frac{1}{4}$, height of body $1\frac{1}{2}$ to 2 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Snout obtuse. Preopercle finely serrated. *Fins*—the soft portion of the dorsal and anal and the caudal rounded. *Colour*—a dark line passes over the snout, separated by a thin white band from the ocular one, which is half as wide as the orbit, and passes to the chest. Another dark parallel line behind, with an intermediate fine light one. Sides with about fifteen fine nearly horizontal dark lines. A dark band along the base of the soft dorsal fin, becoming wider over the free portion of the tail; another band along the centre of the soft dorsal. A light yellow band along the base of the anal with a dark one above it, and a white outer edge. Fins margined with dark and edged with orange. A dark vertical band on the posterior third of the caudal. Ventrals white.

Hab. From the Red Sea to Polynesia.

734. (10.) Chætodon unimaculatus.

Chætodon unimaculatus, *Bloch, Ich.* p. 1181, t. 201, fig. 1; *Day, Fish. India*, p. 107 (see synon.).

D. 13/22–23. A. 3/19–20. L. l. 46. L. tr. 8/19. Vert. 10/14.

Length of head 4, height of body about 2 in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, rather above 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Lower jaw slightly the longer.

Preopercle entire. *Fins*—the dorsal spines strong, increasing in length to about the seventh from which they slightly decrease, the soft portion of the fin, that of the anal, and the caudal rounded. *Colour*—yellowish, with a narrow or moderately wide brownish-black ocular band from in front of the dorsal fin through the middle of the eye to the angle of the preopercle and on to the chest; a black blotch on the side above the lateral line below the last four spines and first two rays; posterior edge of soft dorsal with a narrow black band which is continued over the free portion of the tail on to the hind edge of the anal rays.

Hab. Ceylon to the Malay Archipelago; attaining at least 5 inches in length.

735. (11.) Chætodon collaris.

Chætodon collaris, *Bloch, Ich.* t. 216, fig. 1; *Day, Fish. India*, p. 107, pl. xxvii, fig. 6 (see synon.).

D. 12/26–27. A. 3/20–22. L. r. 43–46/34–36. L. tr. 7/15.

Length of head $3\frac{1}{2}$, height of body $1\frac{2}{3}$ (in young) to $1\frac{1}{2}$ (in adult) in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and $\frac{5}{7}$ apart. A few fine serrations at angle of preopercle. *Fins*—fifth and sixth dorsal spines the longest; second anal spine the strongest and longer than the third; caudal cut nearly square. *Colour*—brownish olive, middle of each scale light citron. A bluish-white band from before dorsal fin over the opercles to the throat, where it expands; a second across the forehead, uniting the eyes; a third across the snout and over the cheek to the chin; opposite the orbit this gives off a hinder branch to angle of mouth and throat. Dorsal and anal tinged with reddish violet, upper fourth of soft dorsal margined with six coloured bands in the following order from without—white, black, scarlet, black, pearl-white, and black; anal with three bands—white, black, and scarlet. Posterior half of caudal pearly white, divided by a black band from a scarlet base. Ventrals black.

Hab. Seas of India to the Malay Archipelago.

736. (12.) Chætodon fasciatus.

Chætodon fasciatus, *Forsk. Descr. Anim.* p. 59, no. 80.
Chætodon lunula, *Cuv. & Val. H. N. Poiss.* vii, p. 59, pl. 173; *Day, Fish. India*, pp. 108, *Suppl.* p. 786 (see synon.).

D. 12/23–26. P. 19. A. 3/18–20. C. 17. L. r. 54/40. L. tr. 7/14.

Length of head $2\frac{3}{4}$ to $3\frac{1}{2}$, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Preopercle serrated. *Fins*—soft dorsal and anal rounded, caudal slightly rounded. *Lateral line*—ceases below last third of soft dorsal. *Colour*—ocular band deep chestnut with white edges, rather wider than orbit; a second brown band from first 5 dorsal spines unites with occipital one; a third band from 5th and 6th dorsal spines gradually widens and goes as low as base of

pectoral fin; a band along base of soft dorsal passes over free portion of tail; caudal with a dark band in its posterior third; dorsal and anal with a dark edge and white margin. In the *young* the vertical bands are badly developed, and there is a large black white-edged ocellus in the centre of the soft dorsal.

Hab. Seas of India, Andaman Islands to the Malay Archipelago.

737. (13.) Chætodon melanotus.

Chætodon melannotus, *Bl. Schn. Syst. Ich.* p. 224.
Chætodon melanotus, *Day, Fish. India,* p. 108, pl. xxviii, fig. 1 (see synon.).

D. 12/19. P. 15. A. 3/18. C. 17. L. l. 37–40. L. tr. 6/16.

Length of head 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, rather more apart. Preoperele very finely serrated. *Fins*—dorsal spines increasing in length to the 5th, behind which they again diminish in height; soft portion of dorsal and anal and the eaudal rounded. *Colour*—yellowish, a narrow black oeular band from in front of dorsal through middle of eye to ehest. Upper fourth of body stained blaek, and black lines along each row of seales; a black band over free portion of tail but interrupted in middle. Fins yellow, a narrow black intermarginal band on soft portions of dorsal and anal, outer edge white; a yellow band across the middle of the caudal, followed behind by a narrow black stripe; last third of fin grey. A short black band at base of first four anal rays.

Hab. Red Sea, seas of India, the Malay Archipelago and beyond; attaining at least 5 inehes in length.

738. (14.) Chætodon octofasciatus.

Chætodon octofasciatus, *Bloch, Ich.* t. 215, fig. 1; *Day, Fish. India,* p. 108 (see synon.).

Munja-cooli-min, Tamil.

D. 11/19–22. P. 19. A. 3/17. C. 18. L. l. 50. L. tr. 12/24.

Length of head 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Edge of preopercle a little rough, but not serrated. *Fins*—dorsal spines increasing in length to the fourth, soft portions of dorsal and of anal rounded; second anal spine the strongest, but not quite so long as third; eaudal eut almost square. *Colour*—buff, vertically banded, with a central band along the snout to between the eyes; the ocular band commences in front of the dorsal fin and passes through the eye (which is about twice its width) to the cheeks and chest; the 2nd goes from 3rd and 4th dorsal spines to behind base of ventral, the 3rd from 7th dorsal spine to before eommencement of anal, the 4th from last two spines to first anal rays, the 5th from first few dorsal rays to anterior third of soft anal, the 6th down last third of soft dorsal, aeross free portion of tail,

increasing in width to near posterior extremity of soft anal, the last over the base of the caudal; soft dorsal and anal with a dark outer edge and light margin.

Hab. Seas of India to the Malay Archipelago and beyond.

739. (15.) Chætodon ocellatus.

Platax ocellatus, *Cuv. & Val. H. N. Poiss.* vii, p. 229.
Chætodon oligacanthus, *Bleeker, Batav. Genootsch. Verhand.* xxiii, Chætod. p. 16; *Day, Fish. India*, pp. 109, *Suppl.* p. 786 (see synon.).

D. 6–7/29–30. P. 15. V. 1/5. A. 3/19–22. C. 17. L. l. 46–48.

Length of head $3\frac{3}{4}$ to 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, 1 diam. from end of snout and also apart. Both margins of preopercle serrated, the inferior most coarsely so. *Fins*—anterior portions of soft dorsal and anal the highest. *Lateral line*—ceases opposite posterior fourth of dorsal. *Colour*—yellowish white, with five vertical brown bands, the anterior four of which have black edges; the ocular is brown and narrower than the orbit; three more similar bands pass from the back to the abdomen; at the upper part of the last is a dark ocellus at the base of the 8th to 12th dorsal rays inclusive; the fifth band is over the free portion of the tail. The posterior half of the ventrals is sometimes black.

Hab. Seas of India, the Malay Archipelago to the Philippine Islands.

2. Genus CHELMON, Cuv.

Syn. *Prognathodus.*

Branchiostegals six or seven; pseudobranchiæ. Body elevated and compressed. Snout produced as a long round tube by the horizontal elongation of the premaxillaries and mandibles, which are laterally connected by membrane; the gape of the mouth small. Preopercle without any spine; it and the preorbital sometimes serrated. Teeth on the jaws; none on the palate. One dorsal, with from 9 to 13 spines, none elongate; anal with 3. Scales of moderate or small size.

Geographical Distribution. Indian and Pacific Oceans.

Synopsis of Indian Species.

A black triangular patch from the dorsal to the snout .... 1. *C. longirostris*, p. 10.
Five orange white-edged cross bands .... 2. *C. rostratus*, p. 11.

740. (1.) Chelmon longirostris.

Chætodon longirostris, *Brouss. Ich.* pl. 7.
Chelmo longirostris, *Day, Fish. India*, p. 109 (see synon.).

D. 11–12/22–25. P. 15. A. 3/18–19. C. 18. L. l. 73–75. L. tr. 11/30.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $7\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. in postorbital portion. Angle and lower edge of preoperele and lower edge of preorbital serrated. *Fins*—dorsal spines strong, the 4th somewhat the longest, exeeeding the rays; soft portion of fin rounded; third anal spine longest. *Colour*—yellow, with a black triangular patch extending from base of first dorsal spine to snout, and its lower edge going through the eye to the opercle. Posterior edge of dorsal with a black margin; a small round black spot at posterior angle of anal; caudal grey, with a rather wide dark band over its base.

Hab. East coast of Africa, seas of India, to the Malay Archipelago and beyond.

741. (2.) Chelmon rostratus. (Fig. 2.)

Chætodon rostratus, *Bloch, Ausl. Fisch.* iii. p. 87.
Chelmo rostratus, *Day, Fish. India,* p. 110, pl. xxviii, fig. 2 (see synon.).

D. 9/29–31. A. 3/20–21. L. l. 47–50. L. r. 54/47. L. tr. 8/20. (Vert. 10/14.)

Length of head nearly or quite 3, height of body about 2 in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. Preopercle finely serrated along both limbs; lower edge of preorbital and supraorbital margin likewise

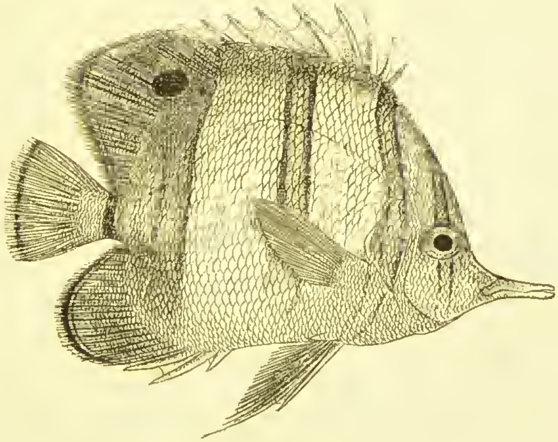

Fig. 2.—*Chelmon rostratus.*

serrated in the young. *Fins*—soft portions of dorsal and anal obtusely angular; caudal rounded. *Colour*—head and body with five orange cross bands edged with brown and with white outer margins, the hindmost round the root of the tail; a round black, white-edged spot in the middle of the soft dorsal and within the fourth cross band; soft dorsal, caudal, and anal with blue and white edges.

The earliest account of the habits of this species is in the 'Philosophical Transactions,' vol. liv, p. 89, and is contained in a letter from J. A. Schlosser. In it he tells us how Governor Hommell found that this fish frequented the shores and sides of the sea and rivers in search of food, and when it saw a fly sitting on the plants that grow in shallow water it swam on to within a distance of 4, 5, or 6 feet, and with surprising dexterity ejected out of its tubular mouth a single drop of water, which never failed to strike the fly into the sea, where it was seized by the fish. He kept some of these fishes in tubs of water, and saw them knock flies into the water even under these circumstances. He sent an example to the Amsterdam Museum, and Bleeker ascertained that this species was referred to. J. Mitchell, Esq., in the 'Edinburgh New Philosophical Journal,' April to September, 1828, p. 162, also recounts how he similarly witnessed this fish thus exercising itself when kept in a pond near Batavia by a Japanese chief. See also a paper on the "Asiatic Blowpipe Fishes," Zoologist, ser. 3, vol. v. 1881, pp. 91-96.

3. Genus **HENIOCHUS**, Cuv. & Val.

Syn. *Taurichthys*, Cuv. & Val.; *Diphreutes*, Cantor.

Branchiostegals five; pseudobranchiæ. . Body elevated and strongly compressed; mouth short, or of moderate length. Teeth villiform, none on the palate. A single dorsal fin, with from 11 to 13 spines, the 4th of which is elongated and filiform; anal with 3. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Seas of India to Polynesia, &c.

742. (1.) Heniochus macrolepidotus. (Fig. 3.)

Chætodon macrolepidotus, *Linn. Syst. Nat.* p. 464.
Heniochus macrolepidotus, *Day, Fish. India*, p. 110, pl. xxviii, fig. 3 (see synon.).

Purroamee, Mal.; *Chuddukun*, Tam.; *Pah-no-dah*, Andam.

D.11-12/24-25. A.3/17-18. L.l.52. L.tr.9/22. Cæc.pyl.6. Vert.10/14.

Length of head 4, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter from 3 to $3\frac{1}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. *Fins*—dorsal spines rather strong, the fourth having a filamentous prolongation reaching to the caudal fin or even beyond, the fifth is also somewhat elongated; 2nd and 3rd anal spines of about equal length and strength; caudal cut nearly square. *Colour*—pearly white, with a dark purplish band over snout, another over eyes, a broad one from 3 first dorsal spines across side, including ventral fin and extending to the anal; the hinder band commences on the dorsal, extending from 5th to 7th spine, curves downwards, and ends in the posterior third of the

anal fin. Pectoral, soft portions of dorsal, anal, and caudal fins bright yellow.

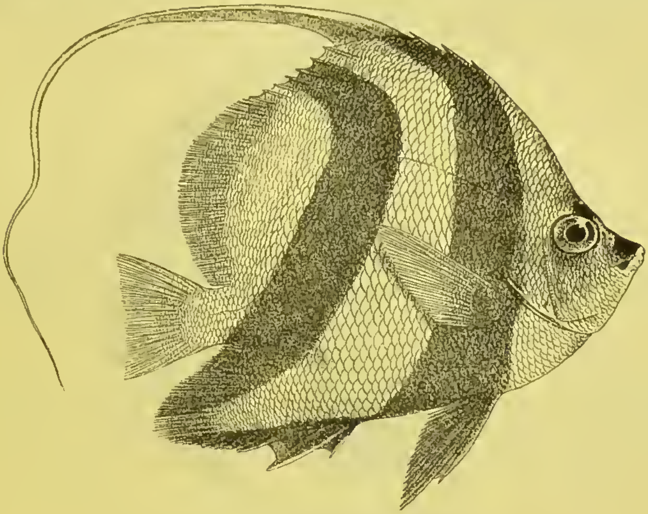

Fig. 3.—*Heniochus macrolepidotus.*

Hab. Throughout the Indian Oeean; said to attain 18 inehes in length.

4. Genus **ZANCLUS**, Cuv. & Val.

Syn. *Gnathocentrum*, Guich.; *Gonopterus* (Gronov.), Gray.

Branchiostegals four; pseudobranchiæ. Body elevated and eompressed. Teeth in the jaws; none on the palate. One dorsal fin with spines, the third of which is very elongate; anal with three. Seales small. Air-bladder present. Pyloric appendages in moderate numbers.

Geographical Distribution. Seas of India to the Malay Arehipelago and beyond.

743. (1.) **Zanclus cornutus.** (Fig. 4.)

Chætodon cornutus, *Linn. Syst. Nat.* p. 461.
Zanclus cornutus, *Day, Fish. India,* pp. 111, pl. xxviii, fig. 4, *Suppl.* p. 786 (see synon.)

D. 7/40–41. P. 19. A. 3/32–34. C. 16. Cæe. pyl. 14. Vert. 9/13.

Length of head rather more than 3, height of body $1\frac{2}{5}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. apart, and twiee the length of postorbital portion of head. *Fins*—dorsal spines very elongated and filiform, the last rays very short; anal much the highest anteriorly; caudal emarginate. *Colour*—yellowish

white, with 2 broad, dark, vertical brown bands, the anterior from between the first dorsal spines and the forehead, descends over the

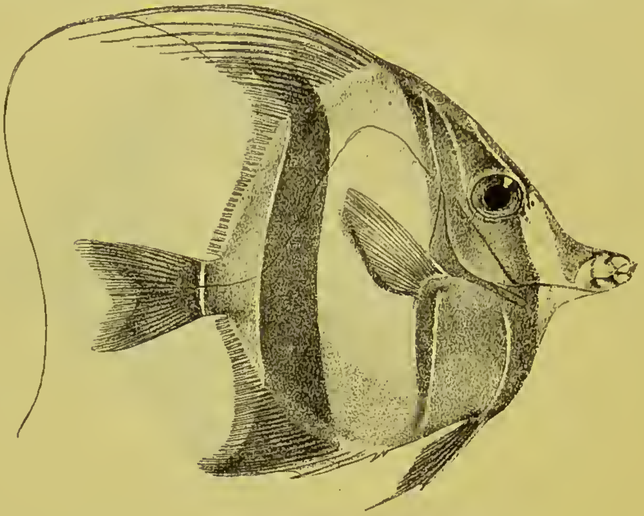

Fig. 4.—*Zanclus cornutus.*

orbits, opercle, and cheek to the ventral; the second band commencing between the base of the fourth spine and the first ray, passes downwards to the highest portion of the anal; this band has a white hinder edge; a third band crosses the caudal, and has a concave posterior margin and a white front edge. There is also a band over the snout. Pectoral yellow.

Hab. Seas of India to the Malay Archipelago and beyond.

5. Genus **HOLACANTHUS**, Lacép.

Syn. *Genicanthus,* Swains.

Branchiostegals six; pseudobranchiæ. Body compressed, and as a rule much elevated. Preopercle serrated, with one or more strong spines at its angle. No palatine teeth. A single dorsal fin with from 12 to 15 spines; anal with 3 or sometimes 4. Scales of moderate or small size. Air-bladder with two horns posteriorly. Pyloric appendages many.

Geographical Distribution. Tropical Seas.

Synopsis of Indian Species.

A. Scales small. L. l. much more than 50.
- Bluish, with about nineteen narrow oblique canary-coloured bands on the body .... 1. *H. imperator*, p. 15.
- Blue, with light vertical curved bands on the body .... 2. *H. nicobariensis*, p. 16.
- Six or seven blue bands radiating from the head .... 3. *H. annularis*, p. 16.

B. Scales of moderate size. L. l. about 50.

Eight to twelve vertical blue brown-edged bands .... 4. *H. diacanthus*, p. 17.
Greyish on sides; a yellow shoulder-spot . . 5. *H. xanthurus*, p. 17.
Blue, with yellow black-edged spots on the cheeks .... 6. *H. xanthometopon*, [p. 18.

744. (1.) **Holacanthus imperator.** (Fig. 5.)

Chætodon imperator, *Bloch, Ich.* iii, p. 51, t. 194.
Holacanthus imperator, *Day, Fish. India*, p. 112, pl. xxviii, fig. 5 (see synon.).

Kulloo-koli-meen, Tamil; *Nga-tyk-pyá*, Arracan; *Dood-ka-mal*, Chittagong.

D. 14/21–22. P. 21. V. 1/5. A. 3/20–21. C. 17.

Length of head 4 to $4\frac{1}{3}$, height of body $1\frac{3}{4}$ to 2 in the total length. *Eyes*—diameter 3 to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Angle of preopercle with

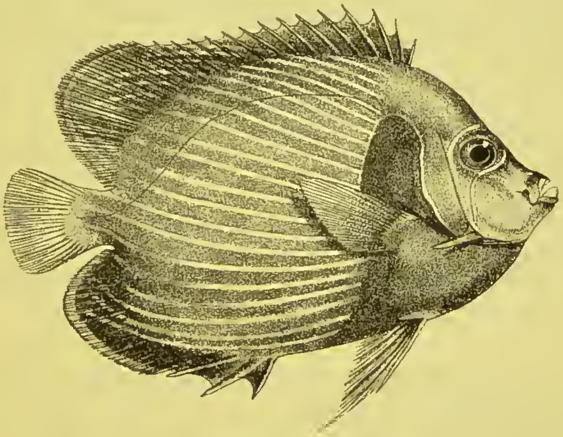

Fig. 5.—*Holacanthus imperator.*

a strong, smooth, curved spine, $1\frac{1}{4}$ diam. of orbit in length. *Fins*—dorsal spines gradually increasing in length, soft portions of dorsal and anal rounded; anal spines strong, third the longest and equal to last dorsal; caudal rounded. *Scales*—small, covering the vertical fins. *Colour*—body blue, with a greenish tinge along the back; about nineteen canary-coloured lines pass upwards to the dorsal, or horizontally to the caudal and anal. A large black descending band with a blue anterior edge on the shoulder; chest chestnut. A light blue stripe across the snout, round the cheeks, and to the preopercular spine, which is nearly black. A brown band edged above with blue crosses the eye and passes on to the preopercle. Opercle yellow, edged with blue; branchiostegals black. A narrow

black edge to the caudal; ventral dark, with orange-coloured rays; pectoral blackish.

Hab. East coast of Africa, seas of India and Malay Archipelago.

745. (2.) Holacanthus nicobariensis.

Chætodon nicobarcensis, *Bl. Schn. Syst. Ich.* p. 219, t. 50.
Holacanthus nicobariensis, *Day, Fish. India*, p. 112, pl. xxviii, fig. 6 (var. semicirculatus) (see synon.).

D. 13–14/21. P. 19. V. 1/5. A. 3/20–21. C. 18. L. r. 85–90/75–80.

Length of head 4, height of body 2 to $2\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ to 1 diam. apart. Preopercular spine smooth, and equal in length to $\frac{3}{4}$ or 1 diam. of orbit. *Fins*—dorsal spines shorter than the rays, the soft dorsal angularly rounded in adult; anal and caudal rounded. *Scales*—minute, about thirteen rows between lateral line and base of sixth dorsal spine. *Colour*—this fish shows different distributions of the same colours. In the young (*H. striatus*) the side is deep blue, with slightly curved vertical bands, alternately white and bluish white, the white being the broader. Caudal white, with or without a narrow black outer margin. In the adult (*H. semicirculatus*) the vertical bands have a more curved direction, the convexity being forwards. In typical *H. nicobariensis* this is still more apparent, a white spot or short transverse band being the centre around which the body-bands are curved. In both the last varieties the tail-fin is coloured. Several excellent ichthyologists consider these to be three distinct species, and not colour-varieties of one form.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

746. (3.) Holacanthus annularis.

Chætodon annularis, *Bl. Ich.* t. 215, fig. 2.
Holacanthus annularis, *Day, Fish. India*, p. 112, pl. xxix, fig. 1 (see synon.).

Jatipyna, Tel.; *Lolla terate*, Mal.; *Nga-lyk-pya*, Arrak.; *Dood-kamal*, Chittagong.

D. 13/20–21. P. 20. V. 1/5. A. 3/19–21. C. 17.

Length of head $4\frac{1}{2}$, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercular spine smooth and as long as diameter of orbit. *Fins*—dorsal spines increase in length to the last; soft portion of fin angular, in adults often produced, that of anal rounded; third anal spine the longest. *Scales*—small. *Colour*—sienna, with a blue ring on the shoulder. Two narrow horizontal blue bands cross the head to the opercles, the upper through the eyes, the lower across the snout, and meet a third vertical band; six

or seven curved blue bands on the side radiate from the head and converge upon the soft dorsal fin; pectoral yellow, with a blue band at its base. Dorsal and anal fins dark, the first with a blue upper edge; anal with three blue lines on it and a light blue margin; caudal yellow, with a narrow orange tip.

Hab. Seas of India to the Malay Archipelago, China, and beyond; attaining at least a foot in length.

747. (4.) Holacanthus diacanthus.

Chætodon diacanthus (*Boddaert*), *Bl. Schn. Syst. Ich.* p. 220.
Holacanthus diacanthus, *Day, Fish. India*, p. 113 (see synon.).

D. 14/19. P. 19. V. 1/5. A. 3/19. C. 17. L. r. 52. L. tr. 7/25.

Length of head 5, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Preopercle strongly serrated, its spine strong, equal in length to about 2 diameters of the orbit. *Fins*—soft dorsal and anal rounded; third anal spine longest and strongest; caudal rounded. *Colour*—yellowish, with from 8 to 12 vertical blue brown-edged bands, those on the body being continued on to the vertical fins. A short band along the snout, two from the summit of the head to the eye and to a little below it; one traverses the opercle, and about eight exist on the body; caudal yellow. Anal with bluish streaks parallel to its base.

Hab. Seas of India to the Malay Archipelago.

748. (5.) Holacanthus xanthurus.

Holacanthus xanthurus, *Bennett, P. Z. S.* 1832, p. 183; *Day, Fish India*, p. 113, pl. xxix, fig. 2 (see synon.).

Kul-kasa, Tamil.

D. 14/19. A. 3/18–19. C. 17. L. l. 50. L. r. 50–55/45. L. tr. 7/22.

Length of head 4 to $4\frac{1}{4}$, height of body 2 in the total length excluding caudal filament. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Dorsal and abdominal profiles about equally convex. Preopercle having a strong smooth spine, which is equal to or rather above 1 diameter of the orbit in length. *Fins*—fourth dorsal spine slightly the longest, last equal to third; soft portion of the fin slightly rounded; third anal spine longest, strongest, and one third longer than the longest dorsal, the soft portions of the two fins similar; caudal rather rounded, with its upper ray produced into a filament. *Scales*—strongly ctenoid and longitudinally fluted, much smaller above than below the lateral line. *Colour*—body greyish brown, darker along the back, and becoming black over the tail as well as on the vertical fins, head, and chest; a lightish opercular band and a small but brilliant yellow shoulder-spot; dorsal and anal fins

edged with yellowish white; caudal canary-colour. After death each scale seems to have a light semilunar band.

Hab. Ceylon and Madras; growing to 6 inches in length.

749. (6.) Holacanthus xanthometopon.

Holacanthus xanthometopon, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 258, *and Atl. Ich.* ix, p. 64, *Chæt.* t. ix, fig. 2; *Day, Fish. India*, p. 114 (see synon.).

D. 14/17. P. 17. V. 1/5. A. 3/17. C. 17. L. r. 47. L. tr. 7/25.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. A strong spine at angle of preopercle, not quite half so long as the head. *Fins*—soft dorsal and anal fins angular; caudal rounded. *Colour*—blue, cheeks and opercles with numerous golden spots externally edged with black; some fine black lines on the lips and chin; a broad yellow interorbital band; body violet, each scale with a brilliant blue spot; a yellow shoulder-spot. Dorsal, caudal, and pectoral yellow, with a black spot at the base of the last seven dorsal rays, caudal with a black edge; ventral and anal white with a blue edge.

Hab. Andamans and Malay Archipelago. There is a specimen, $7\frac{1}{2}$ inches in length, in the Calcutta Museum.

6. Genus SCATOPHAGUS, Cuv. & Val.

Syn. *Cacodoxus*, Cantor.

Branchiostegals six; pseudobranchiæ. Body much compressed and elevated, snout of moderate length. Preopercle spineless. Palate edentulous. Two dorsals, united at their bases, the first having ten or eleven spines, and a recumbent one in front directed forwards; the soft dorsal covered with scales; anal with four spines. Scales very small. Air-bladder simple. Pyloric appendages rather numerous.

Geographical Distribution. Indian Ocean.

750. (1.) Scatophagus argus. (Fig. 6.)

Chætodon argus, *Bloch, Ausl. Fisch.* iii. p. 86.
Scatophagus argus, *Day, Fish. India*, p. 114, pl. xxix, fig. 3 (see synon.).

Vádá, Maráthi; *Qu-ce*, Sind.; *Chitsillo* and *Eesputti*, Tel.; *Sipili*, Tam.; *Nutchar-char*, Mal.; *Nga-pa-thoong*, Arrac.; *Beeshatara*, Chittag.; *Pora-dah*, Andam.; *Dewi koraleyah*, Cingalese.

D. 10 | 1/16–17. P. 20. A. 4/14–16. C. 16. Cæc. pyl. 18 (20).

Length of head 4, height of body 2 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. *Fins*—each dorsal spine thicker on alternate sides,

interspinous membrane deeply notched, fourth spine highest: anterior rays much the longest, but not quite equalling length of 4th spine; anal spines all about the same length, each alternate one being the stronger; caudal fan-shaped, its central rays rather the longest. *Scales*—minute; about 30 rows between 6th dorsal spine

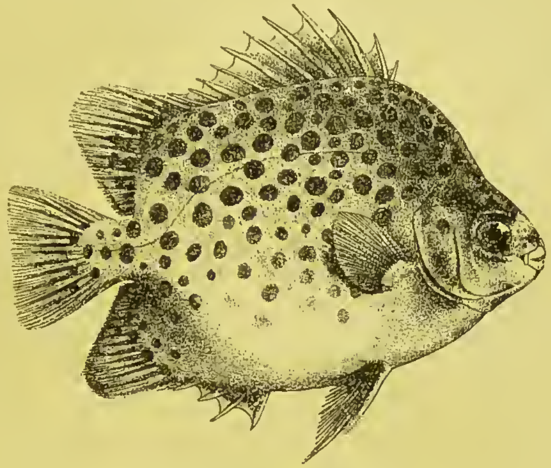

Fig. 6.—*Scatophagus argus.*

and lateral line. *Colour*—purplish, becoming white on abdomen; large round blackish or greenish spots on the body, most numerous along the back, and varying in size and tint. First dorsal brownish blue, having a few minute spots; second dorsal yellowish, with slight brown markings between the rays.

In the *very young* a bony ridge, ending in a spine, passes from the eye above the opercle on to the shoulder.

Hab. Indian Ocean, ranging to China and Australia, attaining a foot in length. This fish enters backwaters and rivers, but is a foul feeder, and, so far as I have observed, is not in request as food. Hamilton Buchanan remarks of it that "when newly caught it is a fish of great beauty, easy digestion, and excellent flavour; but after death it soon becomes soft and strong tasted."

7. Genus **EPHIPPUS**, Cuv.

Syn. *Selene*, Lacép.; *Ilarches*, Cantor.

Branchiostegals six; pseudobranchiæ. Body much compressed and elevated. Snout short, the upper profile parabolic. Preopercle without a spine. No teeth on the palate. Dorsal with eight or nine spines, several of which are flexible and elongate, all are receivable into a groove at their base; interspinous membrane deeply cleft, and a deep notch between the spinous and soft portions of the fin; three anal spines; pectoral short. Scales of

moderate or small size. Air-bladder bifurcated anteriorly, and with two long horns posteriorly. Pyloric appendages free.

Geographical Distribution. Indian and Atlantic Oceans.

751. (1.) **Ephippus orbis.** (Fig. 7.)

Chætodon orbis, *Bloch, Ich.* p. 1187, t. 202, fig. 2.
Ephippus orbis, *Day, Fish. India,* p. 115, pl. xxix, fig. 4 (see synon.).

Kharvad, Maráthi; *Nulla torriti,* Tam.; *Kol-lid-dah,* Andam.

D.8–9/19–20. P.19. A.3/15. C.19. L.l.42. L.tr.7/15. Cæc.pyl.2–4.

Length of head 4 to $4\frac{1}{2}$, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{3}$ in length of head, nearly 1 diam. from end of snout and also apart. *Fins*—dorsal spines moderately strong at the base, interspinous membrane deeply emarginate; the third, fourth, and fifth spines are elongate and filiform at their extremities, especially the third. Soft dorsal rounded. First ventral ray elongate. Second anal spine the strongest, equal to the seventh

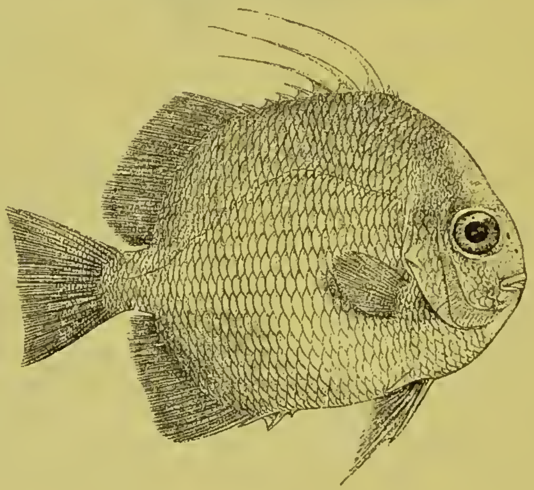

Fig. 7.—*Ephippus orbis.*

dorsal spine in length; anterior rays the longest. Caudal slightly produced in the centre, and somewhat emarginate above and below. *Colour*—back and head greyish green, sides and abdomen silvery shot with pink; fin-membranes diaphanous, finely dotted with black, more especially in their marginal halves; rays bluish white. The young have a dark-grey orbital band, another over the nape, and two over the body: the fins are edged with grey.

Hab. Seas of India to the Malay Archipelago: attaining at least 6 inches in length.

8. Genus DREPANE, Cuv. & Val.

Syn. *Harpochirus*, Cantor; *Cryptosmilia*, Cope.

Branchiostegals six; pseudobranchiæ. Body elevated and much compressed. Snout short. Preopercle spineless. Palate edentulous. Dorsal having in front a concealed spine directed forwards, and eight or nine spinous rays, which, as well as those of the anal, are receivable into a groove at the base; interspinous membrane deeply notched; pectoral long and falciform. Scales of moderate size. Air-bladder posteriorly prolonged into two horns. Pyloric appendages few.

752. (1.) Drepane punctata. (Fig. 8.)

Chætodon punctatus, *Gmel. Syst. Nat.* p. 1243.
Drepane punctata, *Day, Fish. India*, p. 116, pl. xxix, fig. 5 (see synon.).

Syn. *Chandava*, Maráthi; *Punnur*, Sind.; *Shuk*, Baluch.; *Pündthee*, Mal.; *Pulli torritti*, Tam.; *Thetti*, Tel.; *Roopi-chanda*, Chittag.; *Shengna-roët*, Arracan.; *Nga-shengna*, Burm.

D. 8–9/21–22. A. 3/18–19. L. l. 50–55. L. tr. 14/33. Cæc. pyl. 2–3.

Length of head from $3\frac{1}{4}$ to 4, of pectoral 2, height of body $1\frac{1}{3}$ to $1\frac{1}{2}$ in the total length. *Eyes*—diameter from $2\frac{1}{3}$ to 3 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ to $\frac{3}{4}$ apart. *Fins*—dorsal spines strong, in a young individual ($1\frac{3}{10}$ inches long) the

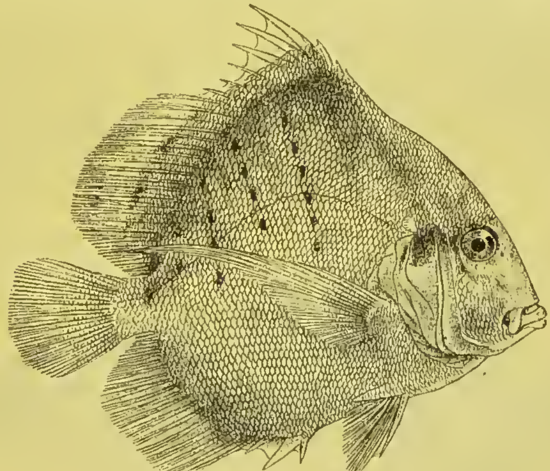

Fig. 8.—*Drepane punctata.*

last six are of equal height. Should there be nine dorsal spines, the fourth is the longest in adults; if only eight then the third; the rays longer than the spines; pectoral sometimes reaching to the base of the caudal; second anal spine the strongest and generally the longest; caudal with its central rays slightly produced. *Colour*—silvery, having a gloss of gold and tinge of purple,

with or without vertical bands and black spots; edges of the fins stained with grey, and a grey band along the middle of the dorsal.

Hab. Red Sea, east coast of Africa, seas of India to Australia; attaining at least 15 inches in length, and in most places esteemed as food.

Second group. TOXOTINA.

9. Genus **TOXOTES**, Cuv.

Branchiostegals seven; pseudobranchiæ. Body oblong, compressed. Snout rather produced; lower jaw the longer. Villiform teeth on jaws, vomer, and palatine bones. A single dorsal fin, having 4 or 5 strong spines, situated in the posterior half of the back; anal with 3 spines. Scales cycloid, of moderate or rather small size. Air-bladder simple. Pyloric appendages in moderate numbers.

It is stated in some works that these wide-mouthed fishes shoot insects with a drop of water in Batavia. Bleeker observed that he never witnessed this, and the action is one which the mouths of these fishes appear incapable of effecting (see p. 12, *ante*).

Geographical Distribution. Seas and estuaries of India, the Malay Archipelago and Polynesia.

Synopsis of Indian Species.

L. l. 42. Two to four rows of large black patches or irregular stripes along sides .... 1. *T. microlepis*, p. 22.

L. l. 31. Five or six oblong black patches on upper half of head and side .... 2. *T. chatareus*, p. 23.

L. l. 27. Four triangular blotches descend from the back to the lateral line .... 3. *T. jaculator*, p. 23.

753. (1.) Toxotes microlepis. (Fig. 9.)

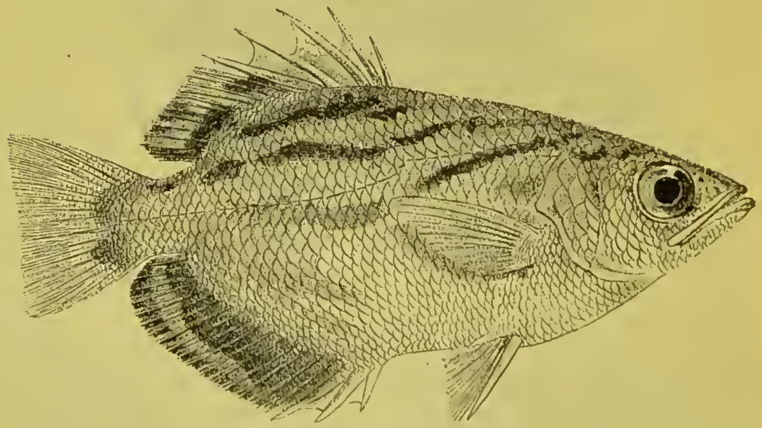

Fig. 9.—*Toxotes microlepis.*

Toxotes microlepis, *Blyth, J. A. S. B.* xxix, 1860, p. 142; *Day, Fish. India*, p. 117, pl. xxx, fig. 1 (see synon.).

Nya-kya-ma, Burmese.

D. 5/13. P. 12. A. 3/17. C. 19. L. l. 42. L. tr. 6/14. Cæc. pyl. 8.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—the dorsal commences slightly in advance of the anal, its last three spines the longest, as is the third of the anal. *Colour*—golden, with two to four large black oblong blotches or stripes along the sides, most being above the lateral line; dorsal blotched with black and having dark edges; anal dark; caudal yellow.

Hab. Burma and Siam to Sumatra and Borneo; growing to at least 6 inches in length.

754. (2.) Toxotes chatareus.

Coius chatareus, *Ham. Buch. Fish. Ganges*, pp. 101, 370, pl. xiv, fig. 34.
Toxotes chatareus, *Day, Fish. India*, p. 117, pl. xxix, fig. 6 (see synon.).

Nga-prong-gryn, *Kodryn*, and *Paulong-gyn*, Arracan.

D. (4)–5/12. P. 13. A. 3/16–17. C. 17. L. l. 31. L. tr. 4–5/11–10.

Length of head $3\frac{3}{4}$ to $3\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal spines strong, the fourth somewhat the longest; (in a specimen with only four dorsal spines the third equals the fourth). Anal commences slightly behind the dorsal, the third spine a little the longest. Caudal cut nearly square. *Colour*—silvery shot with gold; dorsal profile greenish brown, six or seven oblong spots between eye and end of base of dorsal fin; some black blotches on soft dorsal; anal with lower edge black. In the *young* the blotches are larger and darker, the ventral is black, and there is a black band along the base of the caudal.

Hab. Rivers and estuaries of India, Burma, the Malay Archipelago, and found by Steindachner to occur in South Australia. My largest specimen is 8 inches in length, but this species attains upwards of a foot.

755. (3.) Toxotes jaculator.

Sciæna jaculatrix, *Pallas, Phil. Trans.* lvi, 1766, p. 187.
Toxotes jaculator, *Day, Fish. India*, p. 117 (see synon.).

D. 4/11–12. P. 15. A. 3/15–17. C. 17. L. l. 27. L. tr. 4–5/10–9.

Length of head 3, height of body 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. *Fins*—dorsal spines strong, the third the longest. Anal commences below first dorsal spine, the third spine the longest. Caudal rather emarginate. *Colour*—brownish shot with golden; four triangular black blotches pass downwards from the back to the lateral line, most developed in the young. Fins dark.

Hab. Red Sea, seas of India, the Malay Archipelago and beyond.

Family III. MULLIDÆ.

Branchiostegals four; pseudobranchiæ. Body rather elongate. Profile of head convex. Two stiff barbels below the chin belonging to the hyoid apparatus. Teeth feeble and variously inserted. Two dorsal fins, situated at some distance asunder; the anal similar to the second dorsal; ventral with one spine and five rays. Scales large, feebly ctenoid, and rather deciduous. Air-bladder, when present, simple. Pyloric appendages few or in moderate numbers.

Geographical Distribution. Seas of temperate Europe and those of the tropics; many young and some adults have been captured in rivers.

Uses. This family, to which the Red Mullet belongs, furnishes usually excellent food.

Synopsis of Indian Genera.

Teeth in both jaws, on the vomer, and palatine bones .. 1. UPENEOIDES.
Teeth in several rows in both jaws, palate edentulous .. 2. MULLOIDES.
Teeth in a single row in both jaws, palate edentulous .. 3. UPENEUS.

1. Genus UPENEOIDES, Bleeker.

Syn. *Megalepis*, Bianc.; *Upeneus*, sp., Cuv.; *Upeneus* (C. V.), Bleeker, 1874.

Small teeth in the jaws, vomer, and palatine bones.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

Synopsis of Indian Species.

A. Lobes of caudal without dark cross bars .. 2. *U. sulphureus*, p. 25.
B. Lobes of caudal barred.
  a. First dorsal spine minute; 2nd, 3rd, and 4th nearly equal.
    Body chestnut above, not spotted ...... 1. *U. vittatus*, p. 25.
    Body leaden above, not spotted .... 3. *U. cæruleus*, p. 26.
    Head and body with brown spots, a brown lateral stripe .... 4. *U. tragula*, p. 26.
  b. First dorsal spine the longest; fin pointed.
    Sides with red spots .... 5. *U. bensasi*, p. 27.
    Sides without spots .... 6. *U. tæniopterus*, p. 27.

756. (1) Upeneoides vittatus. (Fig. 10.)

Mullus vittatus, *Forsk. Descr. Anim.* p. 31.
Upeneoides vittatus, *Day, Fish. India,* p. 120, pl. xxx, fig. 2 (see synon.).

Cheerul, Mal.; *Chah-ti-ing-ud-dah,* Andam.; *Nga nang young,* Arracan.

D. 8 | 1/8. A. 1/7. L. l. 38–39. L. tr. $2\frac{1}{2}$–3/7. C. pyl. 11. Vert. 7/17.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{3}{4}$ in length of head, $1\frac{1}{3}$ diam. from end of snout, and 1 apart. *Teeth*—in several villiform rows in both jaws and palatines, and in a single row on vomer. *Fins*—spines of first dorsal weak, first minute, second and third nearly the same length, and one third higher than second dorsal; six rows of scales between the dorsal fins; origin of anal below 3rd or 4th dorsal ray, its spine minute. *Scales*—ctenoid, those along median line of abdomen with a blunt keel along their centres. *Lateral line*—tubes arborescent on each scale, especially anteriorly. *Air-bladder*—present. *Colour*—chestnut on the back; golden below. Two or three bright yellow longitudinal bands along each side; first dorsal

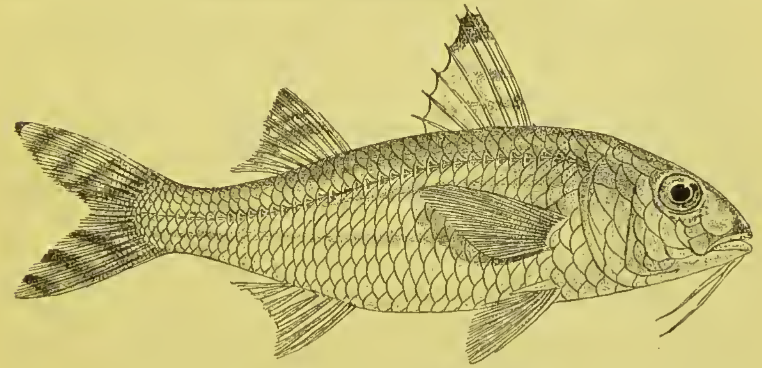

Fig. 10.—*Upeneoides vittatus.*

fin black-edged and with two blackish bands; pectoral pinkish, edged with white; upper caudal lobe crossed by six yellowish-brown bars, and having dark edges and a black tip; lower lobe with three oblique dark bars and a white tip.

Hab. Red Sea, east coast of Africa, seas of India, to the Malay Archipelago and beyond.

757. (2.) Upeneoides sulphureus.

Upeneus sulphureus, *Cuv. & Val. H. N. Poiss.* iii, p. 450.
Upeneoides sulphureus, *Day, Fish. India,* p. 120, pl. xxx, fig. 3 (see synon.).

Navarei, Tamil; *Nga nangyoung,* Arracan.

D. 8 | 1/8. P. 15. A. 7. C. 15. L. l. 35–38. L. tr. $2\frac{1}{2}$/7.

Length of head 4 to $4\frac{1}{5}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total

length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. *Teeth*—in an uninterrupted semilunar band on the vomer. *Fins*—first dorsal spine very small, the third a little longer than second or fourth; six rows of scales between dorsals; second dorsal two thirds as high as spinous; origin of anal below second or third dorsal ray. *Lateral line*—tubes in an arborescent form on each scale. *Air-bladder*—absent. *Colour*—reddish-chestnut on back, becoming silvery on abdomen, which in adults is shaded with yellow. A purplish blotch on the opercle and subopercle. A brilliant golden stripe, two thirds of a scale wide, from orbit to upper third of tail; generally two or three more below and parallel with it, in large specimens a light band along row of scales above lateral line. First dorsal milk-white edged with black, having two horizontal yellow lines finely dotted with black; second dorsal with only one band; caudal reddish, with a black white-edged margin.

Hab. Seas of India to the Malay Archipelago; attaining at least 5 inches in length.

758. (3.) Upeneoides cæruleus.

Upeneoides cæruleus, *Day, P. Z. S.* 1868, p. 194; *Fish. India,* p. 121.

D. 7–8/9. P. 15. A. 7. C. 15. L. l. 32–34. L. tr. $2\frac{1}{2}$/7.

Length of head $4\frac{1}{2}$ to 5, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and also apart. Opercle with two spines. *Teeth*—in a single row on the vomer and palate. *Fins*—first spine of dorsal minute or wanting; 7 or 8 rows of scales between the two dorsals. *Lateral line*—the tubes are rather long and bifurcate in the first portion of the lateral line, the branches subsequently are short, and mostly spring from the upper side. *Air-bladder*—present. *Colour*—leaden above, dirty white below. First dorsal with a black tip, a whitish band along its middle, and a badly marked one at its base; second dorsal dark, with a light band along the middle; extremities of caudal stained with black, and a band across the upper lobe; pectoral, ventral, and anal yellowish.

Considering the time of year at which the specimens have been captured and their small size, it is not improbable that they are the young of a larger species, as *U. vittatus.*

Hab. Madras; growing to 4 inches in length; most common during the months of June and July.

759. (4.) Upeneoides tragula.

Upeneus tragula, *Richardson, Ich. China,* p. 220.
Upeneoides tragula, *Day, Fish. India,* p. 121, pl. xxx, fig. 4 (see synon.).

Chiri, Maráthi.

D. 7–8 | 1/8. P. 13. A. 1/7. L. l. 30–32. L. tr. 2/7. Cæc. pyl. 6.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout rather obtuse anteriorly. A strong preopercular spine, a smaller one at the shoulder just below commencement of lateral line. *Fins*—first dorsal spine minute or absent, first dorsal fin very little higher than second; anal commences slightly behind origin of second dorsal. *Scales*—ctenoid, covering snout and preorbital bone; some over fore part of dorsal and anal fins; four rows between dorsal fins. *Colour*—silvery, head and body spotted with brown, a brown longitudinal band from eye through snout to base of caudal; dorsal fin with dark, almost black, bands; each caudal lobe with five or six oblique black bars.

Hab. East coast of Africa, coast of Sind, the Andamans, to the Malay Archipelago; attaining at least $4\frac{1}{2}$ inches in length.

760. (5.) Upeneoides bensasi.

Mullus bensasi, *Temm. & Schleg. Faun. Japon., Poiss.* p. 30, pl. xi, fig. 2.
Upeneoides bensasi, *Day, Fish. India*, p. 121, pl. xxx, fig. 5 (see synon.).

Te nevere, Tamil.

D. 7/ | 1/8. P. 15. A. 1/7. C. 15. L. l. 32-34. L. tr. 2/7.

Length of head from $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter from $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head, nearly or quite 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Preopercular spine small. *Fins*—four rows of scales between dorsal fins, the first of which is higher than the second. *Scales*—the central row along median line of abdomen with a blunt keel; scales on preorbital. *Lateral line*—the tubules are very arborescent posteriorly, especially on their upper side. *Air-bladder*—absent. *Colour*—chestnut along the back, becoming golden on abdomen; head reddish: a silvery stripe from eye to centre of caudal, with a row of red spots above and another below it. Dorsals tipped with black, and having two reddish bands across them; caudal reddish, the upper lobe having four oblique chestnut bars; pectorals, ventrals, and anal yellow.

Hab. Madras to the Malay Archipelago. Abundant all the year round on the Coromandel coast; attaining to 5 inches in length.

761. (6.) Upeneoides tæniopterus.

Upeneus tæniopterus, *Cuv. & Val. H. N. Poiss.* iii, p. 451.
Upeneoides tæniopterus, *Day, Fish. India*, p. 122 (see synon.).

D. 7 | 1/7. P. 15. A. 7. L. l. 38. L. tr. 3/7. Cæc. pyl. 2.

Length of head, of caudal fin, and height of body each $4\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ apart. A very slight rise from snout to base of first dorsal, a slight swelling over snout in front of eye.

Opercular spine weak. *Fins*—first dorsal spine highest, second very nearly as long; six rows of scales between two dorsal fins. *Lateral line*—the tubes very arborescent posteriorly. *Air-bladder*—large. *Colour*—back reddish, becoming white on abdomen. A large triangular reddish spot is said to have existed on the free portion of the tail, but is not now apparent. First dorsal fin with three brownish longitudinal bands, second dorsal likewise banded; caudal with six oblique streaks across either lobe.

Hab. Ceylon to Australia; attaining at least 12 inches in length.

2. Genus **MULLOIDES**, Bleeker.

Syn. *Upeneus*, sp., Cuv. & Val.

The teeth in the jaws are in several rows; palate edentulous.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

762. (1.) Mulloides flavolineatus. (Fig. 11.)

Mullus flavolineatus, *Lacép. H. N. Poiss.* iii, p. 406.
Mulloides flavolineatus, *Day, Fish. India*, p. 122, pl. xxx, fig. 6 (see synon.).

D. 7 | 1/8. P. 17–19. A. 2/6. L. l. 35–38. L. tr. 2/6. Cæc. pyl. 18.

Length of head $4\frac{1}{3}$, height of body from 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{2}{3}$ diam. from end of snout, and 1 apart. *Fins*—first three dorsal spines of about the same length. Five rows of scales between the dorsal fins. Second dorsal anteriorly half to two thirds as high as the first. First anal spine minute; the fin commences slightly behind origin of second dorsal. *Lateral line*—tubes very arborescent, especially anteriorly. *Air-bladder*—large. *Colour*—upper surface of head

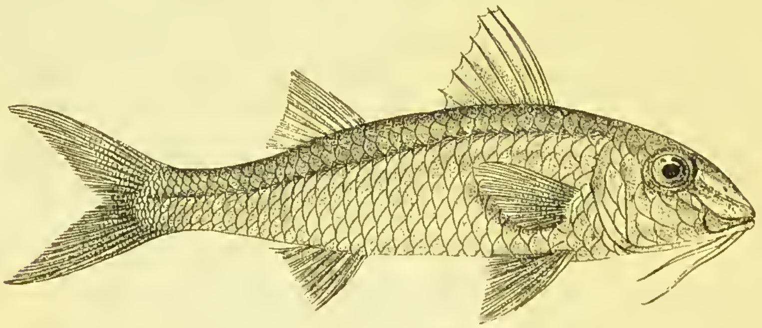

Fig. 11.—*Mulloides flavolineatus.*

and back reddish chestnut, becoming whitish on sides, and tinged with yellow on abdomen. A narrow yellow band from upper edge of eye to snout, and a second from below eye joins it. A brilliant

golden band, rather above one scale in width, from hind edge of eye to middle of base of caudal. Fins flesh-coloured, a yellow band along base of second dorsal; lower lobe of caudal grey.

Hab. Red Sea, through the seas of India to the Malay Archipelago and beyond.

3. Genus **UPENEUS**, Cuv. & Val.

Syn. *Mullupeneus*, Poey; *Parupeneus*, Bleeker (1874).

Only a single row of teeth in either jaw, the palate is edentulous.

Geographical Distribution. Red Sea, Indian Ocean, and beyond.

Synopsis of Indian Species.

A. Last dorsal and anal rays produced .... 1. *U. macronema*, p. 29.
B. Last rays not produced.
  a. A black lateral band .... 2. *U. barberinus*, p. 30.
  b. One or more dark vertical bands from between dorsals .... 3. *U. multifasciatus*, p. 30.
  c. Golden spots on many scales.
    Eyes $6\frac{1}{3}$ in length of head .... 4. *U. luteus*, p. 31.
    Eyes $4\frac{2}{3}$ in length of head .... 5. *U. displiurus*, p. 31.
  d. Large black spot on side of tail and, in life, a golden blotch on side; no lateral band .... 6. *U. indicus*, p. 32.
  e. Vermilion, barbels rosy .... 7. *U. cinnabarinus*, p. 33.

763. (1.) Upeneus macronema. (Fig. 12.)

Mullus macronema, *Lacép.* iii, pp. 383, 404, pl. 13, fig. 2.
Upeneus macronemus, *Day, Fish. India*, p. 123, pl. xxxi, fig. 1 (see synon.).

Khorfi, Arabi.

D. 8/9. P. 16. A. 7. C. 15. L. l. 29–30. L. tr. $2\frac{1}{2}/7$.

Length of head $3\frac{2}{3}$ to 4, height of body 4 to $4\frac{1}{3}$ in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Lips thick. Opercular spine rather strong. *Fins*—first spine of dorsal short, the third and fourth subequal, and nearly or quite twice as high as the anterior dorsal rays; last dorsal and anal rays elongate; ventral a little longer than pectoral. *Scales*—three rows between the dorsal fins. No enlarged pores on the snout. *Lateral line*—with several short bifurcations posteriorly. *Colour*—a black band from the snout through the eye, at first just below the lateral line, subsequently upon it, and ending below the end of the soft dorsal; a black blotch at the base of the caudal fin; these two marks are divided by a light oblique vertical band which passes over the free portion of the tail just behind the second dorsal fin; some golden spots on the scales along the sides of the body. A purplish stripe from eye to snout. First dorsal with its lower half purple, becoming blacker

above; second dorsal with a deep black band along its base, and three light lines higher up; pectoral with a dark base; ventral blackish externally; anal with five or six light longitudinal bands; caudal with a black edging. Each scale below the lateral line with a light blue spot.

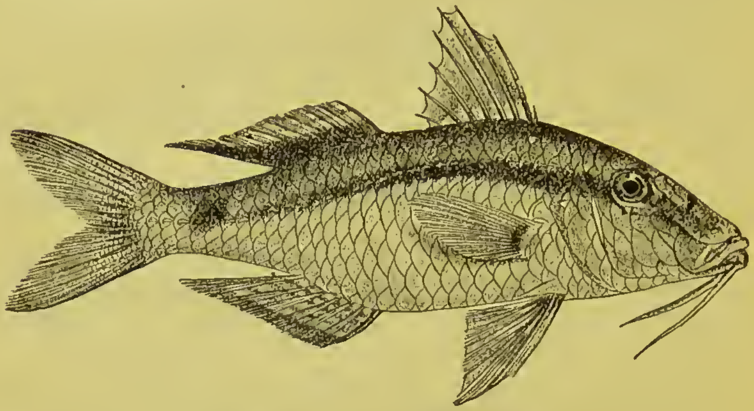

Fig. 12.—*Upeneus macronema.*

Hab. Red Sea, coasts of India, Malay Archipelago and beyond; attaining at least $8\frac{1}{2}$ inches in length.

764. (2.) Upeneus barberinus.

Mullus barberinus, *Lacép. H. N. Poiss.* iii, p. 406, pl. 13, fig. 3.
Upeneus barberinus, *Day, Fish. India*, p. 124 (see synon.).

D. 8/9. P. 18. A. 7. C. 15. L. l. 29–31. L. tr. $2\frac{1}{2}/7$.

Length of head $3\frac{1}{2}$ to 4, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, 3 diam. from end of snout, and $1\frac{1}{4}$ apart. Opercular spine rather strong. *Fins*—first spine of dorsal fin very short, the third, sometimes also the fourth, highest, and about twice the height of anterior dorsal rays; last rays of second dorsal not prolonged. *Scales*—three rows between dorsal fins. *Lateral line*—tubules with several rather long bifurcations posteriorly. *Colour*—a black band from the eye along the lateral line, and from below middle of second dorsal above that line, terminating below end of second dorsal; a round black spot at root of caudal. In some specimens there is a darkish band along the dorsal fins.

Hab. Red Sea, coasts of India, Malay Archipelago and beyond; attaining at least 12 inches in length.

765. (3.) Upeneus multifasciatus.

Mullus multifasciatus, *Quoy & Gaim. Voy. Uranie et Phys.* p. 330, *Atl.* t. lix, fig. 1.
Upeneus multifasciatus, *Day, Fish. India*, p. 124 (see synon.).

D. 8/9. P. 17. A. 7. L. l. 30-32. L. tr. $2\frac{1}{2}$/7. Vert. 10/14.

Length of head $3\frac{3}{4}$ to 4, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 to 6 in length of head, $3\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space very convex. The maxilla, which is very broad posteriorly, reaches a little above half-way below the orbit. Barbels extend 1 diameter of orbit behind posterior edge of preopercle. *Fins*—first spine of dorsal minute, third the longest, and twice as high as the anterior dorsal rays; three rows of scales between bases of dorsal fins. Anal commences on vertical below third or fourth dorsal ray. *Lateral line*—tubes arborescent posteriorly. *Colour*—purplish, a black horizontal band usually exists on the snout, and is continued through the eye sometimes to a good distance behind it. Two or three wide black bands descend from the dorsals or the interspace between them to the middle of the body; these bands are sometimes united into one, sometimes split up into several. There is usually a third band over the free portion of the tail or a spot on the side of its base. Second dorsal, anal, and sometimes the outer half of the ventral finely banded; occasionally a dark basal band exists on the second dorsal.

Hab. Seas of India, to the Malay Archipelago and beyond.

766. (4.) Upeneus luteus.

Upeneus luteus, *Cuv. & Val. H. N. Poiss.* vii, p. 521; *Day, Fish India*, p. 125, pl. xxxi, fig. 2 (see synon.).

D. 8/9. P. 15. A. 7. C. 15. L. l. 30. L. tr. 2/7.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter $6\frac{1}{3}$ in length of head, $3\frac{1}{2}$ diam. from end of snout, and $1\frac{2}{3}$ apart. Barbels with roughened elevations along their whole length and extending to a little behind the posterior edge of the preopercle. *Fins*—first spine of dorsal minute, the third and fourth the longest, and nearly twice as high as the anterior dorsal rays; three rows of scales between bases of dorsal fins. *Lateral line*—the branches of the tubes very short but numerous. *Colour*—reddish, the edges of the scales somewhat the darkest. A broad purplish band, having a light yellow edge on either side, goes from the eye to the snout; three narrow yellow bands across the opercle. Outer edge of preopercle purplish. The centre of each scale on body, except first thirteen of lateral line, has a golden spot; abdomen yellowish. Second dorsal and anal with from three to five bluish longitudinal lines.

Hab. East coast of Africa and seas of India; attaining at least a foot in length.

767. (5.) Upeneus dispilurus.

Mullus dispilurus, *Playfair, Fish. Zanzibar*, p. 41, pl. v, fig. 4 (not 3), adult.

Upeneus displurus, *Day, Fish. India*, p. 125, pl. xxxi, fig. 3 (see synon.).

D. 8/9. P. 15. V. 1/5. A. 1/7. C. 16. L. l. 31. L. tr. 2–$2\frac{1}{2}$/7.

Length of head $3\frac{3}{4}$ to almost 4, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $2\frac{1}{3}$ to $2\frac{1}{2}$ from end of snout, and $1\frac{1}{4}$ apart. Snout pointed, compressed. *Fins*—fourth dorsal spine rather the longest; three rows of scales between the dorsal fins; front portion of the second dorsal two thirds height of first; anal commences slightly behind the origin of the second dorsal. *Scales*—on snout and head including most of the preorbital bone; the uncovered portion has some rather large pores. *Colour*—reddish, the edges of the scales being slightly darker. A broad purplish band, with a light silvery edge, from the eye to the snout; two more narrow silvery lines, formed of short, oblong spots, from hind edge of orbit for a short distance; the two rows of scales above the lateral line, and generally the three below, have a golden-yellow spot in the centre of each scale; a light golden band over the free portion of the tail, behind which is often a dark mark. First dorsal marbled with brown, the second with four and the anal with three reddish bands; caudal reticulated with light grey markings.

Hab. Red Sea, Sind, where it attains at least $9\frac{1}{2}$ inches in length; probably also found in East Africa.

768. (6.) Upeneus indicus.

Mullus indicus, *Shaw, Gen. Zool.* iv, pt. ii, p. 614.
Upeneus indicus, *Day, Fish. India*, p. 126, pl. xxxi, fig. 4 (see synon.).

Rahtee goolivinda, Tel.; *Kul naveri, Mussara*, Tam.

D. 8/9. P. 16. V. 1/5. A. 0–1/7. C. 15. L. l. 30. L. tr. $2\frac{1}{2}$/7.

Length of head from $3\frac{3}{4}$ to 4, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—from $5\frac{1}{2}$ to $6\frac{1}{2}$ (larger in the young) in the length of the head, $1\frac{1}{4}$ diameters apart. Barbels reach to beyond the angle of the preopercle. *Fins*—first spine of anterior dorsal minute, the third and fourth the longest, one half higher than the rays. Anal commences slightly behind the level of the second dorsal and is as high as it. *Lateral line*—tubes becoming very arborescent posteriorly. *Air-bladder*—present. *Colour*—purplish red, with a large oval shining golden blotch, which usually disappears after death, on the lateral line opposite the interspace between the two dorsal fins; a purplish-black mark, lightest in its centre, on either side of free portion of tail; yellow lines or spots on the abdomen. Some light violet lines on upper surface of head. A broad purple band with violet edges from eye to snout; cheeks pink, variegated with yellow and tortuous blue lines; a dark spot at corner of mouth. Dorsal purplish streaked with blue; a few yellow bands on anal; fins pinkish except the caudal, which has the rays purplish, but the membrane has a greenish tinge.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 16 inches in length.

769. (7.) **Upeneus cinnabarinus.**

Upeneus cinnabarinus, *Cuv. & Val. H. N. Poiss.* iii, p. 475; *Day Fish. India*, p. 126.

D. 8/9. P. 15. V. 1/5. A. 7. C. 15. L. l. 29. L. tr. 3/7.

Length of head 4, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, nearly 2 diam. from end of snout, and 1 apart. A rather strong opercular spine. *Fins*—first dorsal spine short, second not quite so long as third. *Scales*—three rows between the two dorsal fins. *Lateral line*—the tubes very arborescent posteriorly. *Air-bladder*—small. *Colour*—vermilion, darkest on the back; there appears to be a central silvery spot in the middle of each scale in the two rows above and the two below the lateral line. Dorsal and anal rays yellow, the membrane reddish; upper caudal lobe orange, the lower one red. A large purple spot covers the opercle and descends on the subopercle. Barbels rosy.

Hab. Ceylon, where it is said to be abundant.

Family IV. SPARIDÆ.

Squamipinnes, pt., Cuv.; *Chætodontidæ*, pt., Richards.

Branchiostegals from 5 to 7; pseudobranchiæ well developed. Body oblong and compressed. Bones of the head with a rudimentary muciferous system. No teeth on the palate (except in *Pimelepterus*); more or less broad and cutting or conical teeth in front of the jaws, or a lateral series of molars, or both conjoined. A single dorsal fin; bases of spinous and soft portions nearly equal; anal with three spines; ventrals thoracic, 1/5. Lateral line continuous, not extending on to the caudal fin. Scales cycloid or minutely ctenoid.

Geographical Distribution. Seas of temperate and tropical regions, some entering fresh waters.

Synopsis of Indian Genera.

First group. CANTHARINA.

Broad cutting-teeth in front of the jaws; no molars; palate edentulous. Lower pectoral rays branched.

Scales on cheeks and opercles, none on the vertical fins .... 1. CRENIDENS.

Second group. SARGINA.

Cutting-teeth in front of jaws and molars at the side. Palate edentulous. Lower pectoral rays simple.

Molar teeth in several rows along the sides of tho jaws .... 2. SARGUS.

Third group. PAGRINA.

Conical teeth in front of the jaws and molars along the sides. Palate edentulous.

No scales on the cheeks	3. LETHRINUS.
Scales on cheeks. A single row of molars......	4. SPHÆRODON.
Scales on cheeks. Two rows of molars in the upper jaw..............................	5. PAGRUS.
Scales on cheeks. Three or more rows of molars in the upper jaw	6. CHRYSOPHRYS.

Fourth group. PIMELEPTERINA.

Cutting-teeth in front of the jaws, and teeth on the palate.

As defined above	7. PIMELEPTERUS.

First group. CANTHARINA.

1. Genus CRENIDENS, Cuv. & Val.

Branchiostegals five; pseudobranchiæ. One or two rows of broad teeth in both jaws, with their cutting-edges crenulated; a band of granular teeth posteriorly but no pointed lateral ones; neither molars nor vomerine teeth. A single dorsal with 11 spines which can be received into a groove; 3 anal spines; lower pectoral rays branched. Scales ctenoid, of moderate size, covering cheeks and opercles, but not the vertical fins. Air-bladder simple. Pyloric appendages in small numbers.

Geographical Distribution. Red Sea and Indian Ocean.

Synopsis of Indian Species.

L. tr. 7/13.	Greyish, fins black-edged........	1. *C. indicus*, p. 34.
L. tr. 5/15.	Silvery, fins grey	2. *C. forskaelii*, p. 35.

770. (1.) Crenidens indicus. (Fig. 13.)

Crenidens indicus, *Day, Report Sea-Fish and Fisheries India*, 1873, p. clxxxvi; *Fish. India*, p. 132, pl. xxxii, fig. 4 (see synon.).

Keen-see, Baluch.; *Oolan*, Tam.

D. 10–12/11–10. A.3/10–11. L.l. 53–55. L. tr. 7/13. Cæc. pyl. 5.

Length of head 4 to $4\frac{1}{2}$, height of body $2\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 to $1\frac{1}{3}$ diam. from end of snout, and 1 apart. Body oval, compressed; a slight swelling above the eyes. *Teeth*—8, compressed, in front of upper jaw, each lobed at the sides; behind this row are three more of the same character but with smaller and more numerous teeth; in the mandible there are ten in the front row smaller than those in the upper jaw, behind these are two or three rows as in the upper jaw. *Fins*—fourth dorsal spine longest; pectoral extending to above anal; second anal spine strong and nearly or quite as long as fourth

dorsal, the third about equal in length; caudal emarginate. *Colour*—greyish silvery, scales on head and anterior portion of body with black edges, dark lines along rows on body; dorsal and anal

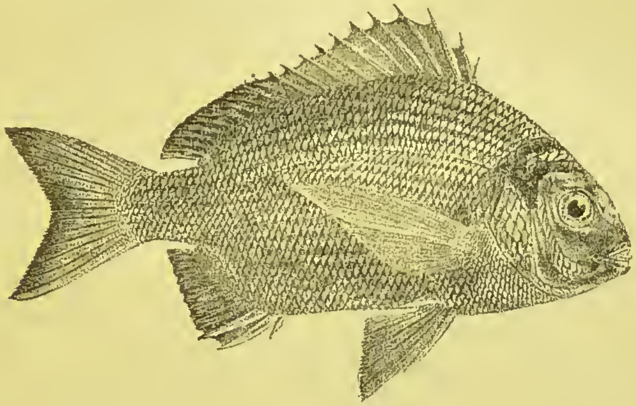

Fig. 13.—*Crenidens indicus.*

black, last anal ray white; pectoral yellow, with its base orange, and a black spot in axilla; outer two thirds of ventral black, the rest bluish white; caudal dark grey, with a black edge.

Hab. Very common along the Sind coast and not rare at Madras; attaining at least 12 inches in length. Also found at Suez.

771. (2.) Crenidens forskaelii.

Crenidens forskalii, *Cuv. & Val. H. N. Poiss.* vi, p. 377, pl. 162 quater; *Day, Fish. India,* p. 135 (see synon.).

D. 11/11. P. 15. A. 3/9–11. C. 17. L. l. 52. L. tr. 5/15. C. pyl. 3.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and also apart. *Teeth*—as in *C. indicus*, but with ten in the anterior row in the upper and twelve in the lower jaw. *Fins*—dorsal spines rather weak, the fourth slightly the longest; pcetoral not reaching to above anal spines, which are weak, the third being equal to $\frac{2}{3}$ of the length of fourth dorsal spine; caudal forked. *Air-bladder*—large, posteriorly two-horned. *Colour*—silvery, the vertical fins rather darker than the body.

Hab. Red Sea, seas of India, Sind, and the coast of Mozambique.

Second group. SARGINA.

2. Genus **SARGUS** (Klein), Cuv.

Branchiostegals five or six; pseudobranchiæ. Opercle either unarmed or with a blunt point. A single row of cutting-teeth in the front part of the jaws, and several lateral rows of rounded

molars. A single dorsal with from 10 to 13 spines receivable into a groove along its base; anal with three. Scales finely ctenoid, of moderate size, covering the cheeks. Air-bladder sometimes notched anteriorly and posteriorly. Pyloric appendages few.

Geographical Distribution. Mediterranean, Atlantic and Indian Oceans.

772. (1.) **Sargus noct.** (Fig. 14.)

Sargus noct (*Ehrenb.*), *Cuv. & Val. H. N. Poiss.* vi, p. 51; *Day, Fish. India,* p. 133, pl. xxxii, fig. 5 (see synon.).

Keen-see, Baluch.

D. 12/13–14. A. 3/13. L. l. 62–68. L. tr. 7–8/16. Vert. 10/13.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 3 to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout and also apart. Snout compressed, lips rather thick. *Teeth*—eight broad, compressed, rather forwardly directed incisors in each jaw, also three rows of rounded molars. *Fins*—dorsal spines increasing in length to fourth, rays much lower than spines. Second anal spine strongest and longest. *Scales*—five rows between the eye and the angle of the preopercle. *Colour*—greyish

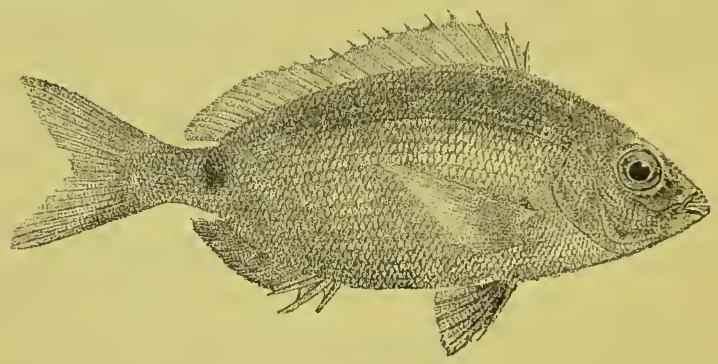

Fig. 14.—*Sargus noct.*

silvery; fine dots on the scales, forming lines along the middle of each row; a darkish spot at the base of the pectoral; a black blotch with a silvery lower border (lost in adult) on lateral line between end of dorsal fin and base of caudal. Fins blackish, except the pectoral, which is flesh-coloured, and the caudal, which has an orange tinge. Eyes golden. Young with narrow vertical brown lines on the body.

Hab. Red Sea (very common at Suez), to the coast of Sind; attaining at least 12 inches in length.

Third group. PAGRINA.

3. Genus LETHRINUS, Cuv.

Palu, Maráthi; *Kuradisa*, Arabi.

Branchiostegals six; pseudobranchiæ. Villiform teeth in anterior portion of jaws, with canines in front of them; lateral teeth in a single row and either conical or with rounded crowns; none on the palate or tongue. Dorsal fin single, receivable into a sheath at its base, and having 10 spines and 9 rays; anal with 3 spines. Scales of moderate size, none on the cheeks. Air-bladder generally notched posteriorly, and having short lateral processes. Pyloric appendages few.

Geographical Distribution. West coast of Africa; Indian and Pacific Oceans.

Synopsis of Indian Species.

A. Lateral teeth conical	1. *L. miniatus*, p. 37.
B. Some or all of the lateral teeth rounded and obtuse.	
a. A quadrangular dark blotch between l. l. and pectoral	2. *L. cinereus*, p. 38.
b. Longitudinal lines of blue spots on scales, and sometimes yellow bands.	
Third dorsal spine longest	3. *L. karwa*, p. 38.
Fourth dorsal spine longest	4. *L. nebulosus*, p. 39.
c. Olive, with yellow longitudinal bands.	
Eyes $1\frac{1}{2}$ diameters from end of snout	5. *L. ornatus*, p. 40.
Eyes 2 diameters from end of snout.......	6. *L. ramak*, p. 40.
d. An oblong blotch below l. l. opposite middle of dorsal	7. *L. harak*, p. 41.

773. (1.) Lethrinus miniatus.

Sparus miniatus (*Forster*), *Bl. Schn. Syst. Ich.* p. 281.
Lethrinus rostratus, *Cuv. & Val. H. N. Poiss.* vi, p. 296; *Day, Fish. India*, pp. 134, pl. xxxiii, fig. 1, *Suppl.* p. 787 (see synon.).

D. 10/9. P. 13. A. 3/8. C. 19. L. l. 48–50. L. tr. 16/16. C. pyl. 3.

Length of head $3\frac{2}{3}$, height of body 4 in the total length. *Eyes*—diameter 5 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Snout pointed and compressed. Length of head $\frac{1}{4}$ more than its height. *Teeth*—three rather small curved canines in front of upper jaw, and a small one on either side of symphysis of lower jaw; from 18 to 20 compressed, conical, and pointed teeth along either ramus of the lower jaw, and about 15 similar teeth in the upper. *Fins*—dorsal spines increasing in length to the fourth, which is not quite so long as the rays; ventral almost reaches the anal spines, the third of which is considerably longer than the second; caudal emarginate. *Colour*—olive-brown, lightest on abdomen. Head, especially above, having a tinge of purple; a dark

brown blotch behind posterior upper angle of eye; narrow oblique dark bands from the eye and opercle to the upper jaw; a large blotch on the opercle. Inside of mouth orange. The centre of each scale with a blue spot, darkest externally; about eight faint vertical bands descend from the back towards the middle of the body, and usually a dark blotch is apparent between pectoral fin and lateral line. A black spot at base of each dorsal ray, and the fin lightly banded; ventrals slate-coloured; some indistinct vertical bands on the caudal.

Hab. Red Sea, coasts of India, Malay Archipelago and beyond; attaining to at least 12 inches in length.

774. (2.) **Lethrinus cinereus.**

Lethrinus cinereus, *Cuv. & Val. H. N. Poiss.* vi, p. 293; *Day, Fish. India*, p. 135 (see synon.).

D. 10/9. P. 13. A. 3/8. C. 17. L. l. 47–48. L. tr. 6/17.

Length of head $3\frac{2}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. *Teeth*—4 small curved canines in upper and 6 in lower jaw; the lateral teeth conical and somewhat irregular in size, especially in the lower jaw; the posterior lower teeth with rounded crowns. *Fins*—dorsal spines increasing in length to 4th and 5th; 2nd and 3rd anal spines about equal and as high as the 3rd dorsal; caudal forked, lobes pointed. *Colour*—olive-brown, a quadranglar black blotch between pectoral fin and lateral line; faint vertical bands more or less broken up on the body; numerous white or blue spots on scales in upper half of first two thirds of body; dorsal fin with brown spots and a red outer margin; pectoral pinkish; ventral slate-coloured; anal similar to second dorsal; caudal with 3 faint brown vertical bands, most distinct in the young.

Hab. Seas of India, to the Malay Archipelago and beyond; my longest specimen from Madras was 9 inches long.

775. (3.) **Lethrinus karwa.**

Lethrinus karwa (*Russell*), *Cuv. & Val. H. N. Poiss.* vi, p. 311; *Day, Fish. India*, p. 135, pl. xxxiii, fig. 2 (see synon.).

Karwa, Tel.

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. l. 48. L. tr. 6/17.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter in the adult 4 to $4\frac{1}{4}$ in length of head, $2\frac{1}{2}$ diam. from end of snout, and 1 apart. Head rather higher than long. *Teeth*—four large and strong canines on each side in both jaws; in the adult all lateral teeth in upper jaw with rounded crowns; in the lower jaw the first five teeth are more or less conical and

rounded, those behind have rounded crowns. *Fins*—dorsal spines increasing in length to the third, which is scarcely so long as the longest ray; second anal spine not so long as third, which equals length of second dorsal, and is nearly as high as the rays; caudal emarginate. *Colour*—olivaceous brown, becoming lighter on abdomen; the centre of each scale with a cobalt-blue spot, so as to form longitudinal lines, in some specimens there are intermediate yellow bands; inside of mouth orange; pectoral flesh-coloured, base of its second ray bright blue; dorsal, caudal, and anal slate-coloured, margined with orange, and having a line of spots along the centre of the rays; ventral externally slate-coloured. In most adult specimens there is a faint quadrangular spot between lateral line and pectoral and also indistinct vertical bands. In some the edges of the opercle, subopercle, and branchiostegal rays are blood-red.

Hab. Red Sea, seas of India; a specimen captured in Madras in June, 1867, was 16 inches in length.

776. (4.) **Lethrinus nebulosus.** (Fig. 15.)

Sciæna nebulosa, *Forsk. Descr. Anim.* p. 52, no. 61.
Lethrinus nebulosus, *Day, Fish. India,* p. 136, pl. xxxiii, fig. 4 (see synon.).

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. l. 46–48. L. tr. 6/16.

Length of head $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and 1 apart. Numerous fine open pores on lower surface of mandibles, and even on cheeks in adult. *Teeth*—four rather small canines in front of either jaw, the first 3 lateral teeth in upper jaw and the first 6 or 7 in the lower rather conical,

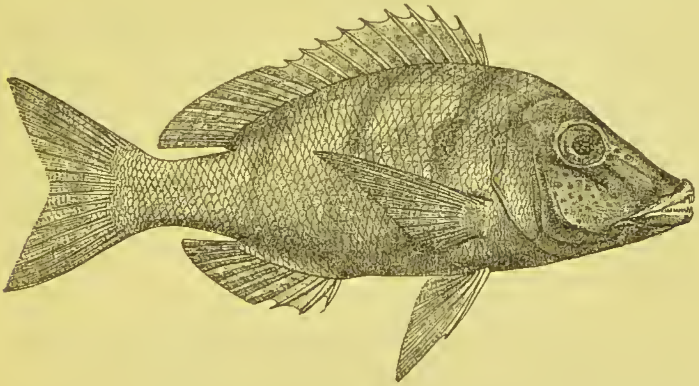

Fig. 15.—*Lethrinus nebulosus.*

the remainder with globular crowns. *Fins*—dorsal spines increasing in length to the 4th, which is about equal to longest ray; the 2nd anal spine nearly one fourth shorter than third, which is nearly as

long as third dorsal; caudal forked, lobes pointed. *Scales*—the row containing the lateral line rather smaller than those above and below. *Colour*—two blue, black-edged bands from eye to posterior nostril and mouth, another below the eye; preopercle spotted blue. Inside of mouth orange; opercular membrane yellow, sometimes blood-red. Body olivaceous, lighter on abdomen; scales orange along their centres, and every other row spotted with blue at its base: in some specimens faint vertical bands are perceptible, and a darkish blotch between pectoral and lateral line, whilst the rows of scales below the pectoral have a narrow dark line along their centres. A large specimen had parts of the head tinged with blue. Dorsal, caudal, and anal slate-coloured, the dorsal edged with reddish, and having two rows of blue spots; faint lines along the soft dorsal and anal; the caudal with narrow blue transverse bars; upper pectoral ray blue in its basal half.

Lethrinus opercularis is probably a variety of this species.

Hab. Red Sea and the seas of India; very common at Madras. Attains at least $16\frac{1}{2}$ inches in length.

777. (5.) Lethrinus ornatus.

Lethrinus ornatus, *Cuv. & Val. H. N. Poiss.* vi, p. 310; *Day, Fish. India*, p. 137 (see synon.).

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. l. 48. L. tr. 6/15.

Length of head $3\frac{3}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. Dorsal profile somewhat elevated. *Teeth*—four conical canines in either jaw, the first five lateral teeth in each jaw conical and pointed, the remainder with rounded crowns. *Fins*—dorsal spines increasing in length to fourth, which is highest, as long as longest ray; second anal spine rather stronger but shorter than third, which equals third dorsal and is nearly as high as the rays. Caudal forked. *Scales*—the row containing the lateral line is much smaller than that above or that below it. *Colour*—greenish olive, with six or seven yellow horizontal bands: the opercular membrane red; caudal edged with red. A violet band across the base of the pectoral fin.

Young specimens have dorsal and anal edged reddish, and irregular blackish blotches about the body; the largest, which is somewhat quadrangular, being above middle of base of pectoral.

Hab. Andamans to the Malay Archipelago.

778. (6.) Lethrinus ramak.

Sciæna ramak, *Forsk. Desc. Anim.* p. 52, no. 64.
Lethrinus ramak, *Day, Fish. India*, p. 137 (see synon.).

D. 10/9. P. 13. V. 1/5. A. 3/8. C. 17. L. l. 50. L. tr. 6/14.

Length of head $3\frac{2}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{4}$ in length of head, 2 diam. from end of snout, and

$1\frac{1}{4}$ apart. Fine pores visible over most of the scaleless portion of the head. *Teeth*—canines rather small, lateral row in jaws near the front compressed and pointed, the posterior 6 or 8 rounded, the first few larger. *Fins*—dorsal spines increasing in length to 3rd and 4th, which are not quite so long as the last rays. Second anal spine strongest, but not so long as 3rd, which equals 2nd dorsal; caudal forked. *Colour*—olive, with yellow longitudinal bands; a small violet spot in axilla.

Hab. Red Sea and Ceylon.

779. (7.) Lethrinus harak.

Sciæna harak, *Forsk. Descr. Anim.* p. 52, no. 63.
Lethrinus harak, *Day, Fish. India,* p. 137, pl. xxxiii, fig. 3 (see synon.).

Po-tang-dah, Andam.

D. 10/9. P. 12. A. 3/8. C. 17. L. l. 46–47. L. tr. $5\frac{1}{2}$/15. Cæc. pyl. 3.

Length of head $3\frac{2}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in length of head, rather above 2 diam. from end of snout, and 1 apart. Snout rather elongate and pointed, having a slight swelling above anterior upper edge of eye. *Teeth*—canines in both jaws moderate; the first four teeth in the lateral row conically obtuse, whilst the hind teeth are large and rounded. *Fins*—dorsal spines increasing in length to 4th, which is about equal to length of rays. Ventral just reaches anal spines, of which the third is slightly the longest; caudal forked. *Colour*—greenish olive, with an oblong blackish blotch below the lateral line opposite the middle of the dorsal fin.

Hab. Red Sea, seas of India and the Malay Archipelago.

4. Genus SPHÆRODON, Rüpp.

Syn. *Chrysophrys,* sp., Cuv. & Val.; *Monotaxis,* Bennett.

Branchiostegals six; pseudobranchiæ. Jaws with conical canines in front and a single row of molars laterally. A single dorsal fin with 10 spines, receivable into a groove at their base; 3 anal spines. Scales of moderate size, extending on to the cheeks. Pyloric appendages few.

Geographical Distribution. Red Sea and Indian Ocean.

780. (1.) Sphærodon grandoculis.

Sciæna grandoculis, *Forsk. Desc. Anim.* p. 53, no. 65.
Sphærodon heterodon, *Günther, Cat.* i, p. 465; *Day, Fish. India,* p. 138, *Suppl.* p. 787 (see synon.).

D. 10/10. P. 15. A. 3/9. C. 17. L. l. 44–48. L. tr. 5/14.

Length of head 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{2}{3}$ to 1 diam. from end of

snout, and 1 apart. A swelling over the anterior upper edge of the orbit. *Teeth*—molars very broad. *Fins*—dorsal spines increasing in length to the third and fourth, behind which they continue about the same length; pectoral extends to above the anal; caudal deeply forked and elongate in the young. *Colour*—rosy, scales with darker edges; base of pectoral violet.

Considerable changes in the form of this fish occur with age, the head becoming much more obtuse in adults, the preorbital comparatively higher and the upper jaw longer, extending further posteriorly in old specimens. Markings on the body disappear with age, but black or deep blue spots, which are absent in the young, appear at the bases of the dorsal and anal fins.

Hab. Ceylon and Malay Archipelago.

5. Genus **PAGRUS**, Cuv.

Syn. *Argyrops*, Swains.

Branchiostegals six; pseudobranchiæ. Jaws with an anterior row of conical canines, and laterally two rows of rounded molars, with sometimes a rudimentary third. A single dorsal fin with from 11 to 12 spines, sometimes elongate, receivable into a groove at their base; anal with 3. Scales of moderate size, extending on to the cheeks. Air-bladder simple. Pyloric appendages, when present, in small numbers.

Geographical Distribution. Atlantic, Mediterranean, Red Sea, and Indian Ocean to New Zealand.

781. (1.) Pagrus spinifer. (Fig. 16.)

Sparus spinifer, *Forsk. Descr. Anim.* p. 32, no. 23.
Pagrus spinifer, *Day, Fish. India*, p. 138, pl. xxxiii, fig. 5, *Suppl.* p. 787 (see synon.).

Soh-ru, Baluch.; *Kooroota*, Tel.; *Pununtlai*, Tam.

D. 11–12/9–11. P. 15. A. 3/8–9. L. l. 53. L. tr. 6–7/18. Cæc. pyl. 5.

Length of head $3\frac{2}{3}$ to $3\frac{3}{4}$, height of body $2\frac{1}{2}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ to 4 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and nearly 1 apart. *Teeth*—four conical incisors in front of each jaw, with about three rows of rounded teeth immediately behind them; two rows of teeth with rounded crowns along the sides of either jaw, the hindermost small and in more than two rows, the first few in the outer row of the maxilla may be more or less conical. *Fins*—dorsal spines compressed, the young having filamentous prolongations, first two very short, just appearing above the scales, the third the longest in the fin; the 2nd anal spine a little stronger than the third and of about equal length; caudal emarginate. *Scales*—cycloid. *Colour*—whitish, with pinkish bands passing along the middle of every scale and becoming rather indistinct below the middle of the body. In

specimens up to 4 inches in length there are five vertical bands on the body.

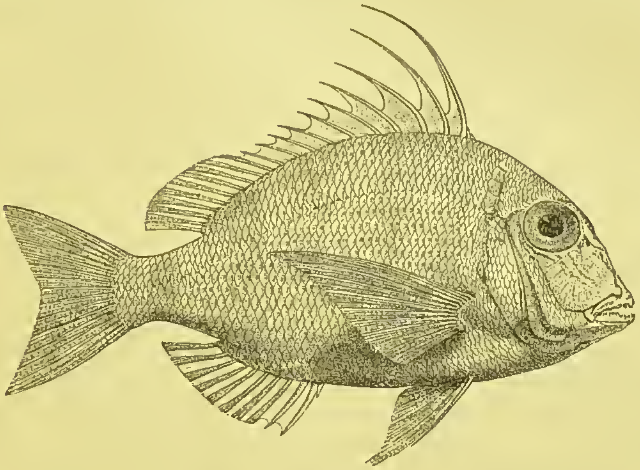

Fig. 16.—*Pagrus spinifer*.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago.

6. Genus **CHRYSOPHRYS**, Cuv.

Syn. *Chrysoblephus*, Swainson.

Branchiostegals six; pseudobranchiæ. Body oblong, compressed. Four to 8 conical or compressed teeth in front, and 3 or 4 rows of rounded molars laterally in both jaws. A single dorsal fin, with from 11 to 13 spines, receivable into a groove at their base; anal with 3 spines. Scales of moderate size, extending over the cheeks. Air-bladder sometimes notched or with very short appendages. Pyloric appendages few.

Geographical Distribution. Tropical and warmer temperate seas.

Synopsis of Indian Species.

A. Six incisors in front of each jaw.
- *a.* Second anal spine very large, exceeding any dorsal spine.
  - L. tr. 4–5/11 .... 1. *C. datnia*, p. 44.
  - L. tr. 6/13 .... 2. *C. berda*, p. 44.
- *b.* Second anal spine not longer than dorsal spines.
  - Height of body 3–3½ in total (sometimes 4 incisors only) .... 3. *C. cuvieri*, p. 45.
  - Height of body 2¾ in total.............. 4. *C. aries*, p. 46.

B. Six incisors in upper, 4 in lower jaw ...... 5. *C. bifasciata*, p. 46.

C. 4–6 incisors in upper, 6–8 in lower jaw .... 6. *C. sarba*, p. 47.

782. (1.) Chrysophrys datnia. (Fig. 17.)

Coius datnia, *Ham. Buch. Fish. Ganges*, pp. 88, 369, pl. 9, fig. 29.
Chrysophrys datnia, *Day, Fish. India*, pp. 140, pl. xxxiv, fig. 1, *Suppl.* p. 788 (see synon.).

Karkutla, Maráthi; *Maramus*, Arabic.

D. 11–13/11–10. A. 3/8–9. L. l. 46–48. L. tr. 4–5/11. C. pyl. 4.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout and also apart. A slight protuberance above the anterior upper angle of the orbit. Dorsal profile considerably elevated. Vertical limb of preopercle very finely serrated; opercle with a well-developed spine. *Teeth*—six incisors in front of either jaw, with rounded teeth behind them; an outer row of only 4 or 5 compressed teeth at the side in either jaw, within this are 3 or 4 rows of rounded molars in the lower and 4 or 5 in the upper jaw; the inner teeth of the hind rows are the largest. *Fins*—dorsal spines alternately broader on each side, the fourth the longest. *Colour*—silvery grey, the bases of the scales darkest and their edges silvery:

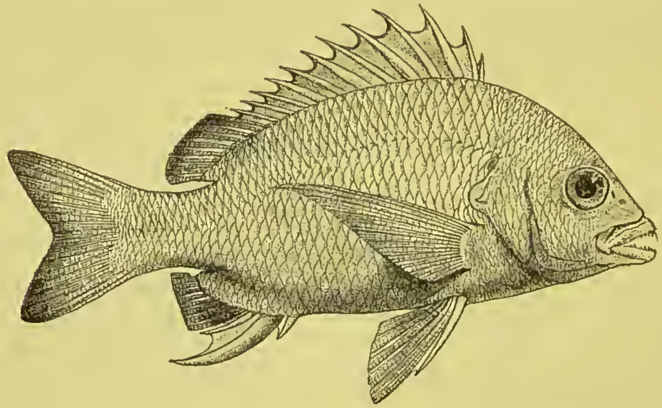

Fig. 17.—*Chrysophrys datnia.*

this is most distinct above the lateral line; a dark interorbital band; dorsal and caudal with black edges, a dark band along soft dorsal and first few anal rays.

Hab. Seas and estuaries of India and the Malay Archipelago; growing to 18 inches in length.

783. (2.) Chrysophrys berda.

Sparus berda, *Forsk. Descr. Anim.* p. 32, no. 24.
Chrysophrys berda, *Day, Fish. India*, pp. 140, pl. xxxiv, fig. 2, pl. xxxv, fig. 2 (var. calamara), *Suppl.* p. 788 (see synon.).

Kharva, Maráthi; *Dun-de-a* and *Jarras*, Sind.; *Calamara*, Tel.; *Aree*, Mal.; *Coorrie* and *Currapu-mattawa*, Tam.; *Kala mudwan*, Hind.; *Nya-wah*, Mugh; *Moo-roo-kee-dah*, Andam.

D. 11–12/11–12. A. 3/8–10. L. l. 44–46. L. tr. 6/13. C. pyl. 3.

Length of head 4, height of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head (in a young specimen $4\frac{3}{10}$ inches long 3), $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout and also apart. Dorsal profile much more convex than abdominal. Vertical margin of preopercle a little roughened or even minutely serrated; opercle with a distinct spine. *Teeth*—six incisors in front of either jaw, the remainder of the teeth with rounded crowns, except occasionally a few in outer row of upper jaw; three or four rows in lower jaw, four or five in upper, the largest being the last of the inner series. *Fins*—each alternate dorsal spine strongest on one side, the fourth or fifth slightly the longest. Second anal spine much the longest and strongest, being from $\frac{1}{2}$ or a little more (in typical *berda*) to $\frac{3}{4}$ (in var. *calamara*) the length of the head; caudal emarginate. *Air-bladder*—notched posteriorly. *Colour*—in *berda* silvery grey. Scales darkest at their bases. Usually a black spot behind opercle. A black edge to dorsal interspinous membrane; soft dorsal, caudal, and anal with black edges; a dark band along anal fin. In specimens from Sind brownish bands usually radiate from the eye. In the variety *calamara* the fish is dark greyish, the scales with dark edges, the fins black or edged with black. Some specimens are much darker than others.

Hab. Red Sea, and seas of India to the Malay Archipelago and beyond. I have taken specimens of *C. berda* in Sind 30 inches in length. The var. *calamara* is known as "black rock cod" in the Madras Presidency, and is excellent eating; it is common in Malabar until July.

784. (3.) **Chrysophrys cuvieri.**

Chrysophrys cuvieri, *Day, Fish. India*, p. 141, pl. xxxiv, fig. 3, *Suppl.* p. 788 (see synon.).

D. 11/11–12. P. 15. A. 3/8–9. L. l. 48. L. tr. 4–5/13.

Length of head $3\frac{1}{2}$ to 4, height of body from 3 to $3\frac{1}{2}$ (in the young) in the total length. *Eyes*—diameter 6 (to 4 in the young) in length of head, $1\frac{1}{4}$ to 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Dorsal profile but little elevated in the adult. Opercle with a distinct spine. *Teeth*—four to six sharp, pointed and rather conical incisors in front of either jaw, with villiform teeth behind them; a pointed and compressed row along outer side of each jaw, the last few teeth of which are small and with rounded crowns; inside these are two rounded rows of small molars in the lower and three in the upper jaw. *Fins*—dorsal spines alternately strongest on each side, the 4th or 5th the highest; first anal spine short, the second strong and longest; caudal slightly lobed. *Scales*—seven rows between the eye and angle of the preopercle; the caudal with fine scales almost to its end. *Colour*—silvery grey, about eight lines radiate from eye and posterior edge of preorbital; each row of scales has a darkish band along its centre; dorsal and caudal fins black-tipped, a grey band along the middle

of the dorsal fin and a grey spot at the base of each spine and ray; anal spines grey, the membrane and rays black, except the last two rays, which are white.

Hab. Seas of India; growing to at least 14½ inches in length.

785. (4.) Chrysophrys aries.

Chrysophrys aries, *Temm. & Schleg. Faun. Japon., Poiss.* p. 67, pl. 31; *Day, Fish. India, Suppl.* p. 788.
Chrysophrys haffara, *Cuv. & Val. H. N. Poiss.* vi, p. 108; *Day, Fish. India,* p. 142, pl. xxxv, fig. 1 (see synon.), *not* Sparus haffara, *Forsk.*

D. 11/13. P. 15. A. 3/11. L. l. 60. L. tr. 6–7/14. Cæc. pyl. 3.

Length of head 4¼ to 4½, height of body 2¾ in the total length. *Eyes*—diameter 3¼ to 4¼ in length of head, 1½ to 2 diam. from end of snout, and 1 apart. Dorsal profile much more convex than abdominal; a prominence over fore part of orbit; posterior nostril very elongated. Preopercle entire; opercle with a spine. *Teeth*—six conical and compressed incisors in front of either jaw, sometimes only four in lower; remaining teeth with rounded crowns, the largest in the inner row, three rows in lower, four in upper jaw. *Fins*—dorsal spines rather weak, the fourth the highest. Pectoral longer than head; anal spines comparatively weak, the second a little the strongest and slightly the longest; caudal lobed. *Scales*—five rows between the eye and the angle of the preopercle, a very long one at base of ventral fin. *Colour*—silvery, with golden bands along each row of scales as in *C. sarba*; usually no black mark on the shoulder; fins grey, ventral and anal almost black.

Hab. Red Sea and Sind to China; the largest specimen I obtained in Sind measured 12 inches in length.

786. (5.) Chrysophrys bifasciata.

Chætodon bifasciatus, *Forsk. Descr. Anim.* p. 64.
Chrysophrys bifasciata, *Day, Fish. India,* p. 141, pl. xxxiv, fig. 5 (see synon.).

D. 11/12–15. A. 3/10–11. C. 19. L. l. 48–50. L. tr. 7/15. C. pyl. 2.

Length of head 3½, height of body 2½ in the total length. *Eyes*—diameter 4½ in length of head, 1½ to 2 diam. from end of snout, and 1⅓ apart. Dorsal profile more convex than abdominal; a slight elevation above the anterior angle of the eye. *Teeth*—six large compressed incisors in front of upper and four in lower jaw; five rows of rounded molars along sides of upper and four in lower jaw. *Fins*—dorsal spines strong, increasing in length to fifth, rays scarcely higher than spines; pectoral a little longer than the head; second anal spine much the strongest and equal in length to third; caudal forked. *Colour*—silvery, with dark lines along each row of scales on the body, and two vertical black cross bands, the first through eye, the second over hind edge of opercle; a yellow band

before the eyes; snout black; dorsal, caudal, and pectoral yellow; dorsal spines black, and a narrow black edge along soft dorsal; ventral and anal black except the last anal ray, which is yellow.

Hab. Red Sea, east coast of Africa and seas of India; attaining at least 15 inches in length.

787. (6.) Chrysophrys sarba.

Sparus sarba, *Forsk. Descr. Anim.* p. 31, no. 22.
Chrysophrys sarba, *Day, Fish. India,* p. 142, pl. xxxiv, fig. 6 (see synon.).

Tin-til, Baluch.; *Chitchillee,* Tel.; *Vella-mattawa,* Tam.; *Suffada-muddawa,* Hind.

D. 11/13–14. P. 15. A. 3/11. C. 17. L. l. 55–60. L. tr. 6–7/14.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{3}{4}$ in the length of head, $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile slightly more convex than abdominal. Vertical limb of preopercle entire, angle and lower edge crenulated; opercle with a badly marked spine. *Teeth*—from 4 to 6 broad and compressed incisors in front of upper jaw and 6 to 8 in lower, the remainder of teeth with rounded crowns, the largest in the inner row; about three rows in lower and four in upper jaw. *Fins*—dorsal spines alternately broader on each side, the fourth the highest. Pectoral longer than head; second anal spine strongest, equal to the third or a little shorter and equal to the sixth dorsal; caudal emarginate or slightly lobed. *Scales*—five rows between the eye and the angle of the preopercle; some small ones over the caudal fin. *Colour*—silvery, with golden bands along each row of scales, parallel to the back above the lateral line and horizontal below it; fins yellowish, with a tinge of grey along upper portion of dorsal and end of caudal; a dark band along middle of former fin. Eyes golden.

Hab. Red Sea and seas of India; attaining at least 16 inches in length. This species abounds in Madras about April, when the young ascend the rivers and backwaters. As food it is inferior to *C. berda.*

Fourth group. PIMELEPTERINA.

7. Genus PIMELEPTERUS (Lacép.), Cuv.

Syn. *Kyphosus* (Lacép.), Cuv.

Branchiostegals seven; pseudobranchiæ. Preopercle as a rule serrated. Villiform teeth in the jaws, with an outer cutting row; fine teeth on the vomer, palatines, and tongue. A single dorsal with 11 spines, anal with 3. Small scales on soft portions of vertical fins. Air-bladder divided behind into two long processes, and sometimes notched anteriorly. Pyloric appendages few or very numerous.

Geographical Distribution. Tropical seas.

Synopsis of Indian Species.

Longest dorsal spines higher than the rays .... 1. *P. vaigiensis*, p. 48.
Dorsal spines not so high as the rays .... 2. *P. cinerascens*, p. 48.

788. (1.) **Pimelepterus vaigiensis.**

Pimelepterus vaigiensis, *Quoy & Gaim. Voy. Uranie et Phys., Zool.* p. 386, pl. lxii, fig. 4.
Pimelepterus fuscus, *Day, Fish. India*, p. 143, *Suppl.* p. 788 (see synon.), *not* Xyster fuscus, *Lacép.*

D. 10–11/13–15. A. 3/12. L. l. 60. L. tr. 10/23. C. pyl. numerous.

Length of head 5, height of body 3 in the total length. *Eyes*—diameter 4 in length of head, rather above 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Body oblong, compressed, and with a swelling opposite the front of the orbit. *Fins*—dorsal spines increasing in length to 5th, 6th, and 7th, which are $\frac{1}{3}$ to $\frac{1}{2}$ higher than the longest ray; pectoral slightly longer than the ventral; anal spines moderate, the third much the longest and half the length of first ray; caudal emarginate. *Colour*—grey, darkest along back and at edges of scales. A silvery band under eyes.

Hab. Red Sea, throughout the seas of India to the Malay Archipelago and beyond; attaining upwards of 2 feet in length.

789. (2.) **Pimelepterus cinerascens.** (Fig. 18.)

Sciæna cinerascens, *Forsk. Descr. Anim.* p. 53, no. 66.
Pimelepterus cinerascens, *Day, Fish. India*, p. 143, pl. xxxv, fig. 3 (see synon.).

Thendala, Tam.; *Ma oung na*, Arracan.

D. 11/12. P. 18. A. 3/11. C. 17. L. l. 60. L. tr. 10/21.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and

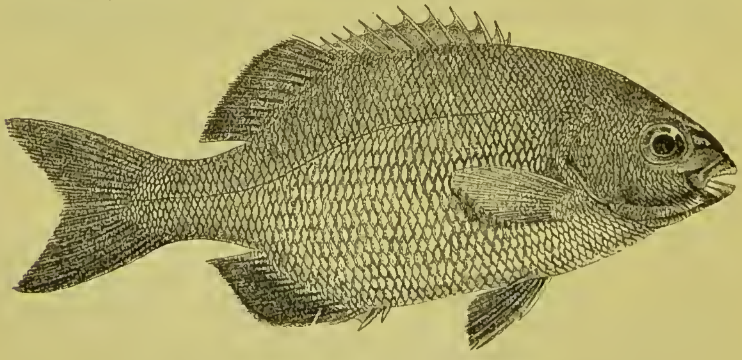

Fig. 18.—*Pimelepterus cinerascens.*

$1\frac{1}{3}$ apart. Body oblong, compressed, with a slight swelling opposite the front of the orbit. *Fins*—dorsal spines increasing in

length to the 4th and 5th, which are nearly as high as the middle rays, the highest in the fin, the whole enveloped in scales; pectoral of the same length as the ventral; anal spines moderate, the third slightly the longest, but only half or two fifths the height of anterior portion of soft anal, which is scaled, as is also the soft dorsal; caudal emarginate. *Colour*—silvery grey, with a dark band between each row of scales; a silvery band under the eye; fins nearly black.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago.

Family V. CIRRHITIDÆ.

Percoidei, pt., et *Sciænoidei*, pt., Cuv.; *Theraponidæ*, pt., et *Polynemidæ*, pt., Richardson.

Branchiostegals three, five, or six; pseudobranchiæ. Body oblong and compressed. Teeth in the jaws villiform or pointed; sometimes canines as well. A single dorsal fin composed of spines and rays of nearly equal extent; anal with three spines. Lower pectoral rays simple, and generally thickened; ventrals 1/5. Scales cycloid; lateral line continuous. Air-bladder absent, or with many appendages. Pyloric appendages few.

Geographical Distribution. Tropical seas, temperate parts of South Pacific.

Synopsis of Indian Genera.

Opercle unarmed. No teeth on palatines ...... 1. Cirrhites.
Opercle with spines. Teeth on palatines ...... 2. Cirrhitichthys.

1. Genus CIRRHITES (Comm.), Cuv.

Syn. *Amblycirrhitus*, Gill; *Paracirrhites*, Bleeker.

Branchiostegals six. Preopercle denticulated; opercle unarmed. Villiform teeth in both jaws; canines generally present; teeth on the vomer, none on the palatines. A single dorsal fin with ten spines; the lower five to seven pectoral rays are unbranched. Scales of moderate size. Air-bladder absent. Pyloric appendages few.

Geographical Distribution. Indian Ocean and tropical Pacific.

790. (1.) Cirrhites forsteri. (Fig. 19.)

Grammistes forsteri, *Bl. Schn. Syst. Ich.* p. 191.
Cirrhites forsteri, *Day, Fish. India*, p. 144, pl. xxxv, fig. 4 (see synon.).

D.10/11. P.7+vii. A.3/6. L.l.50. L.tr.5/13. C.pyl.4. Vert.10/16.

Length of head $3\frac{1}{2}$ to 4, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in total length

Eyes—diameter $4\frac{1}{2}$ to $5\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Anterior nostril rather valvular and fringed. *Teeth*—strong canines on either side of symphysis of upper jaw, two large and some small lateral conical canine-like teeth in the mandible; the villiform teeth on the vomer in a triangular patch, with its base behind. *Fins*—dorsal spines increasing in length to third and fourth, then slightly decreasing in length to the last but one; interspinous membrane with a fine prolongation behind each

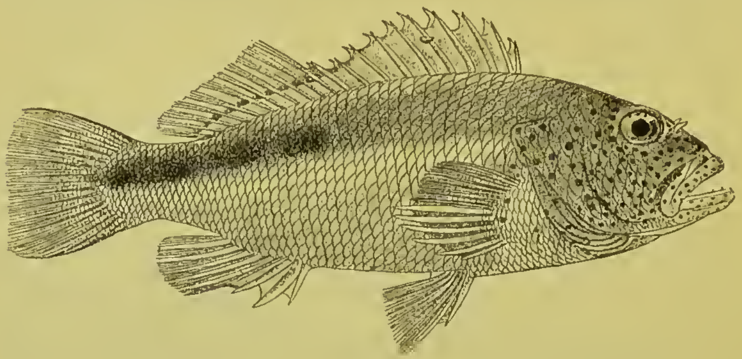

Fig. 19.—*Cirrhites forsteri.*

spine, highest rays of dorsal as long as those of anal; lower free rays of pectoral longer than branched rays; second anal spine the strongest and as long as the third; caudal cut square or slightly emarginate. *Colour*—reddish; head, chest, and base of pectoral fin with black spots; a broad dark band along the middle of the body to the upper half of the caudal, becoming brown with black blotches in its last third. A wide yellow band from above pectoral to lower half of caudal. Upper edge of last half of spinous dorsal black, continued as a black band along base of soft dorsal; front edge of anal and outer edge of soft caudal with narrow black margins.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond. Bennett observes, "The *Tik kossah* of the Cingalese inhabits rocky situations, seldom exceeds eighteen inches in length, and is a firm-fleshed and wholesome fish."

2. Genus **CIRRHITICHTHYS**, Bleeker.

Syn. *Cirrhitopsis*, Gill.

Branchiostegals six. Preopercle denticulated; opercle spinate. Villiform teeth and canines in the jaws; teeth also in the vomer and palatines. A single dorsal fin with 10 spines; anal with 3: 5 to 7 of the lower pectoral rays unbranched. Scales of moderate size. Air-bladder absent. Pyloric appendages few.

Synopsis of Indian Species.

P. 9/v–vi. No elongate dorsal ray. Vertical bands of colour .... 1. *C. fasciatus*, p. 51.
P. 7/vi–vii. First dorsal ray prolonged .... 2. *C. aureus*, p. 51.
P. 7/vii. No elongate dorsal ray. Body spotted .... 3. *C. marmoratus*, p. 52.

791. (1.) Cirrhitichthys fasciatus.

Cirrhites fasciatus, *Cuv. & Val. H. N. Poiss.* iii, p. 76, pl. 47; *Day, Fish. India,* p. 145, *Suppl.* p. 788.

D. 10/12. P. 9+v–vi. V. 1/5. A. 3/6. C. 15. L. l. 41. L. tr. $3\frac{1}{2}$/10.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body $2\frac{1}{2}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{3}$ apart. *Teeth*—some enlarged in front of upper jaw and three moderately sized canines in middle of side of lower; villiform on vomer and palatines. *Fins*—dorsal interspinous membrane emarginate; fourth dorsal spine highest; from it they decrease to the last but one, which is not so high as the last; soft portion of fin as high as spinous; second anal spine longest, rather exceeding the highest dorsal. *Scales*—cycloid, those on the head large. *Colour*—greyish, becoming white below, vertically banded darker; some white spots on the snout and nape. Two small specimens received from Madras were grey with a pinkish tinge; a narrow dark band from the eye along the snout, a second passing round the chin, and a third in a similar direction from behind the eye. Some large black spots on the opercles and upper surface of the head. A large dark blotch on the nape of the neck, and six still larger along the base of the dorsal fin; on which they are likewise continued in the form of spots. Body with three or four large blotches below each of those mentioned, being the remains of vertical bands; caudal fin with some very indistinct markings.

Hab. Madras, whence two specimens were procured, the larger 1·6 inches in length.

792. (2.) Cirrhitichthys aureus. (Fig. 20.)

Cirrhites aureus, *Temm. & Schleg. Faun. Japon., Poiss.* p. 15, t. vii, fig. 2.

Cirrhitichthys aureus, *Day, Fish. India,* p. 145, pl. xxxv, fig. 5 (see synon.).

Shun-gun, Tam.

D. 10/12–13. P. 7+vi–vii. A. 3/6–7. C. 15. L. l. 43. L. tr. 4/12.

Length of head 4, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{2}{3}$ apart. *Teeth*—villiform, with an outer rather enlarged row in the upper jaw, and two or more rather curved and conical lateral rows in the mandible; villiform bands on vomer and palate. *Fins*—

dorsal spines increasing in length to the fifth and sixth; first ray elongate, otherwise soft portion of fin only as high as spinous; the two upper, free, pectoral rays the longest and reaching to above the anal spines; second anal spine strongest and much the longest; caudal slightly emarginate. *Colour*—rosy, with lightish longitudinal lines and a large ill-defined blotch below the soft dorsal extending halfway down the side, in some specimens two more descend

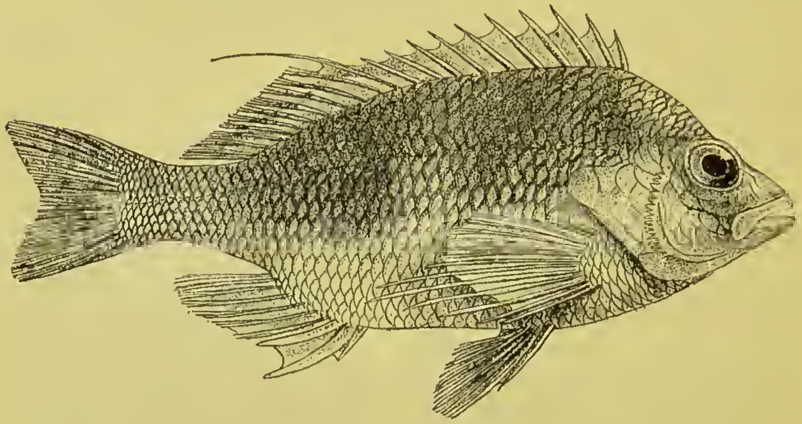

Fig. 20.—*Cirrhitichthys aureus.*

from the spinous dorsal; a small dark blotch behind upper edge of the preopercle. Dorsal and caudal fins more or less banded, soft dorsal darker than spinous portion, and having a light outer edge; caudal with red spots.

Hab. Seas of India to the Malay Archipelago and Japan. Rather common at Madras; attaining to about 4 inches in length.

793. (3.) Cirrhitichthys marmoratus.

Labrus marmoratus, *Lacép. H. N. Poiss.* iii, p. 493, pl. v, fig. 3.
Cirrhitichthys marmoratus, *Day, Fish. India*, p. 146 (see synon.).

D. 9–10/11–12. P. 7+vii. A. 3/6. L.l. 40. L.tr. 4/10. Vert. 10/16.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{3}{4}$ apart. A broad fringed valve to the posterior nostril. *Teeth*—villiform in the jaws, vomer, and anterior portion of the palatines. *Fins*—dorsal spines increase in length to the 5th and 6th, which are as long as the rays, no prolonged dorsal ray; second anal spine strongest, longest, and equalling the highest in the dorsal fin. *Colour*—body and vertical fins with brown spots, and a row of dark spots along base of dorsal.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond.

Family VI. SCORPÆNIDÆ.

Sclerogenidæ, pt., Owen.

Branchiostegals five to seven; pseudobranchiæ. Body oblong, compressed or subcylindrical. Some of the bones of the head armed; suborbital ring articulated with the preopercle by a bony process. Teeth in villiform bands. A single dorsal fin; the anal usually similar to the soft dorsal; ventrals thoracic. Air-bladder generally present. Pyloric appendages, when present, few or in moderate numbers.

Geographical Distribution. Some of these fishes are found in most seas.

Synopsis of Indian Genera.

A. Body with distinct scales.	
a. No occipital groove. No barbel or free pectoral ray. Fins not elongate. Interorbital space convex, scaly. No long spines on preopercle or preorbital......	1. SEBASTICHTHYS.
b. An occipital groove; interorbital space concave.	
Teeth in jaws, vomer, and palatines......	2. SCORPÆNA.
No palatine teeth	3. SCORPÆNOPSIS.
c. No occipital groove.	
Interorbital space concave; some spines and rays greatly elongate and free	4. PTEROIS.
A mandibular barbel and a free pectoral ray	5. APISTUS.
Interorbital space concave. Sharp and long preorbital and preopercular spines	6. CENTROPOGON.
B. Scales rudimentary or wanting.	
a. Articulated fin-rays branched; no free pectoral rays; upper profile of head not in a straight line with the back.	
a'. Dorsal fin high, ventrals well developed. Three anterior dorsal spines distinct from others	7. GYMNAPISTUS.
No division in dorsal spines	8. AMBLYAPISTUS.
b'. Dorsal fin low, ventrals rudimentary ..	9. MICROPUS.
b. Articulated fin-rays unbranched.	
One free pectoral ray	10. MINOUS.
No free pectoral ray	11. COCOTROPUS.
c. Articulated fin-rays mostly branched.	
a'. Two free pectoral rays	12. PELOR.
b'. Three free pectoral rays.............	13. CHORIDACTYLUS.
c'. No free pectoral rays; upper profile of head in almost a straight line with back.	
a''. Head large, $\frac{1}{3}$ of total length or more.	
Teeth in jaws and vomer, not on palate	14. SYNANCIDIUM.
Teeth in jaws, not on vomer or palate	15. SYNANCEIA.
b''. Head less than $\frac{1}{4}$ total length.	
Three anal spines	16. LEPTOSYNANCEIA.
No anal spines....................	17. POLYCAULIS.

1. Genus SEBASTICHTHYS, Gill.

Branchiostegals six; pseudobranchiæ. Head and body somewhat compressed. No groove on the occiput, usually a few small spines; preopercle armed. Villiform teeth on the jaws and vomer, but none on the palatines. Fins not elongate; a single dorsal, the spinous portion more or less separated from the soft by a notch, spines 12 to 14; anal not elongate, with 3 spines; no free rays to the pectoral fin. Articulated fin-rays branched. Scales present, and of moderate or small size, extending as far forwards as the orbit or even beyond; no skin appendages. Air-bladder, as a rule, present. Pyloric appendages few or in moderate numbers.

794. (1.) Sebastichthys strongia.

Scorpæna strongiæ, *Cuv. & Val. H. N. Poiss.* iv, p. 323.
Sebastichthys strongia, *Day, Fish. India*, p. 148 (see synon.).

D. 11–12 | 1/9. P. 19. A. 3/5. C. 15. L. l. 45. L. tr. 5/16.

Length of head 3, height of body more than 3 in the total length. *Eyes*—diameter a little less than 3 in length of head, $\frac{3}{4}$ diam. from end of snout, $\frac{1}{2}$ apart. Supraorbital ridge spinose; two spinose lines given off from the orbit, one towards the occiput, the other towards the lateral line. A sharp spine on nostril. Ridge below orbit to angle of preopercle also spiny, and two more strong spines on lower margin of preopercle. Three strong spines on preorbital and a very strong one at shoulder. Two tentacles above the orbit and several more about the head. *Fins*—the lower 8 rays of the pectoral with free extremities. Dorsal spines strong, increasing in length to the 9th; second dorsal rather lower than first; second anal spine longest and strongest; caudal rounded. *Lateral line*—in single tubes, with here and there tentacles. *Colour*—brownish, banded darker, the first band passing downwards through the eye; a large brown spot on opercle; fins irregularly banded in dotted lines.

Hab. Ceylon, Andamans, Malay Archipelago.

2. Genus SCORPÆNA, Artedi.

Syn. *Neosebastes*, Guichenot; *Pseudomonopterus*, Bleeker.

Branchiostegals seven; pseudobranchiæ. Head large, with a scaleless groove on the occiput, armed with spines and usually with skinny flaps. Villiform teeth on the jaws, vomer, and palatines. A single dorsal fin deeply notched, with 12 spines; anal with 3 spines, not elongate; pectoral large, without free rays. Air-bladder absent. Pyloric appendages few.

Geographical Distribution. Tropical seas; also in the Mediterranean and on the Atlantic coasts of America.

Synopsis of Indian Species.

L. tr. 6/22.	An orbital tentacle	1. *S. bleekeri*, p. 55.
L. tr. 9/19.	No orbital tentacle	2. *S. armata*, p. 55.

795. (1.) Scorpæna bleekeri. (Fig. 21.)

Scorpæna haplodactylus, *Day, Fish. India*, p. 149, pl. xxxvi, fig. 2 (not *Bleeker*).
Scorpæna bleekeri, *Day, Fish. India*, p. 747.

D. 11 | 1/9. P. 5+xii. A. 3/5. C. 15. L. l. 26. L. r. 44/42. L. tr. 6/22.

Length of head 3, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{1}{2}$ apart. Interorbital space deeply concave, no groove below eyes. Two spines on the posterior upper edge of the orbit, the hinder furnished with a tentacle. Occipital, temporal, and suborbital ridges armed with spines; a strong turbinal spine: three strong spines on vertical limb of peropercle and two blunt ones along its horizontal border; two strong opercular spines. Several fleshy tentacles about the head. A strong spine above the base of the pectoral fin on the

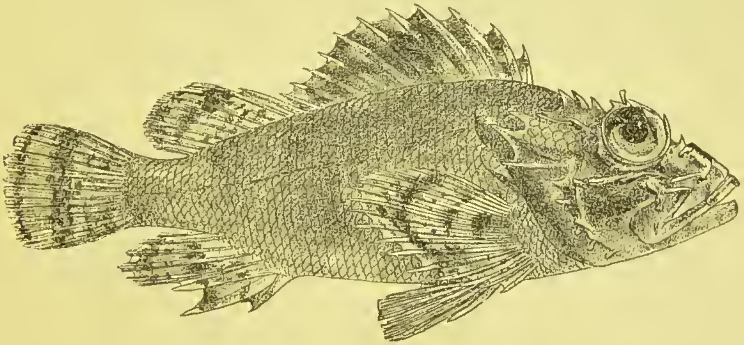

Fig. 21.—*Scorpæna bleekeri.*

shoulder-girdle. *Fins*—dorsal spines increase in length to 4th, from it they decrease in length to 11th; 12th spine twice as high as 11th; soft dorsal slightly higher than the spinous; second anal spine the strongest and longest; caudal rounded. A few fleshy tentacles along the lateral line. *Colour*—brownish black, banded and marbled with darker: anal having a broad band along its basal half; one vertical band at base of caudal, another along its middle, and a dark margin edged with white; dorsal with brown marks.

Hab. Andamans.

796. (2.) Scorpæna armata.

Scorpæna armata, *Sauvage, Nouv. Arch. du Museum*, ix, 1873, *Bull.* p. 49, pl. 6, fig. 1; *Day, Fish. India*, p. 149.

D. 11 | 1/9. P. 6+xii. A. 3/5. C. 13. L. l. 35. L. tr. 9/19.

Length of head $2\frac{3}{4}$, height of body 3 in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{3}{4}$

apart. The maxilla reaches to nearly below hind edge of orbit. Interorbital space very concave, with a quadrangular fossa, along which are two low ridges that terminate posteriorly in two spines; a deep groove below the eyes. Two or three spines along the upper margin of the orbit; a turbinal spine; spines on preorbital and preopercle. Opercle with two spines. Occipital and temporal ridges spiny. *Fins*—fifth dorsal spine rather above half the height of the body; pectorals and ventrals of the same length, extending slightly beyond the anus; third anal spine the longest, exceeding the highest in the dorsal fin; caudal slightly rounded. *Colour*—roseate brown, with darker blotches and a few yellowish-white spots; head spotted with black. Fins yellowish brown, spotted with darker, sometimes forming lines.

Hab. Two specimens, obtained in the East Indies, were presented to the Paris Museum by M. Bonaré.

3. Genus **SCORPÆNOPSIS**, Heckel.

Syn. *Scorpænichthys* and *Parascorpæna*, Bleeker.

Differs from *Scorpæna* in having no palatine teeth.

Geographical Distribution. Same as the last genus.

Synopsis of Indian Species.

D. 12 | 1/9. No orbital tentacle. Scales over cheeks and opercles	1. *S. guamensis*, p. 56.
D. 11 | 1/10. Orbital tentacle, if present, small. Head scaleless	2. *S. cirrhosa*, p. 57.
D. 11 | 1/10. Orbital tentacle well developed. Scales on upper portions of opercle and preopercle	3. *S. leonina*, p. 57.
D. 11 | 1/10. An orbital tentacle. Scales on upper portion of opercles................	4. *S. rosea*, p. 58.
D. 11 | 1/9. Apparently no orbital tentacle. Head scaleless	5. *S. venosa*, p. 59.

797. (1.) Scorpænopsis guamensis.

Scorpæna guamensis, *Quoy & Gaim. Voy. Uranie et Phys., Zool.* p. 326.
Scorpænopsis guamensis, *Day, Fish. India*, p. 150, *Suppl.* p. 788 (see synon.)

D. 12 | 1/9. P. 9+x. V. 1/5. A. 3/5. C. 13. L. r. 43.

Length of head 3, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Interorbital space concave. No groove beneath the eyes. Supraorbital edge spiny. No orbital tentacle. The maxilla reaches to below the middle of the eye. Spines on head acute. *Fins*—highest dorsal spines equal half of the height of the body. *Scales*—present on cheeks and opercles. *Colour*—brown marbled with darker.

Hab. Malay Archipelago, and said to have been brought from the East Indies.

798. (2.) Scorpænopsis cirrhosa.

Perca cirrhosa, *Thunb. Nya Handl. Stockh.* xiv, 1793, p. 199, pl. 7, fig. 2.
Scorpænopsis cirrhosa, *Day, Fish. India*, p. 150 (see synon.).

D. 11 | 1/10. P. 6+xii. V. 1/5. A. 3/5. C. 13. L. r. 56.

Length of head 3, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space deeply concave, with two low ridges along its whole extent which do not end in spines; a deep groove below the anterior edge of the orbit; a shallow groove over occiput; occipital and temporal ridges strongly spinose. Two strong spines along the upper edge of the orbit. Sometimes an orbital tentacle of small size, which is, however, mostly absent. A spinous ridge from the preorbital across the cheeks; preopercle spiny; opercle with two spines. *Tentacles*—besides the orbital one, there are many more about the head and a very large one above the angle of the mouth; there are also some on the body. *Fins*—dorsal spines increase in length to the 4th, which is half as high as the body, and usually shorter than second anal; ventral reaches the anus; caudal cut nearly square. *Scales*—none on the head. *Colour*—pinkish brown marbled with darker; fins spotted and blotched.

Hab. Red Sea, east coast of Africa, seas of India to Malay Archipelago and beyond.

799. (3.) Scorpænopsis leonina.

Scorpæna leonina, *Richard. Ich. China*, p. 216.
Scorpænopsis oxycephala, *Day, Fish. India*, p. 150, pl. xxxvi, fig. 3, *Suppl.* p. 788 (see synon.).

D.11 | 1/10. P.6+xii. V.1/5. A.3/5. C.13. L.r.52/46. L.tr. 7/22.

Length of head $3\frac{1}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Interorbital space deeply concave, with two low ridges, not ending in spines, along its whole extent, between them anteriorly is a third; a deep groove below front third of orbit, continued as a shallow one below eye. Three strong spines along upper edge of orbit, with a tentacle between the last two. A strong turbinal spine. A tentacle to front nostril. Preorbital with ridges in a star-shape, about seven in number, and ending in spines; a spiny ridge across the cheeks to a strong spine in centre of vertical border of preopercle; opercle with two spines. A spine on shoulder-girdle just above base of pectoral. *Tentacles*—besides those enumerated, a large one above angle of mouth, some small ones along margin of preopercle, a few also on lateral line and on some of the body-scales. *Fins*—third dorsal spine very slightly longer than fourth, and about as long as the rays; second anal spine much the strongest; caudal cut square. *Scales*—present on upper portions of opercle and preopercle. *Colour*—reddish, clouded with

brown, and having a few blackish spots; a dark band traverses the spinose dorsal obliquely and descends between the 6th and 7th spines on to the back; many blotches on fins; a dark band over last half of caudal; three narrow dark horizontal bands across lower half of anal; undivided pectoral rays spotted; ventral with brown spots.

Hab. Nicobars to the Malay Archipelago and beyond.

800. (4.) Scorpænopsis rosea. (Fig. 22.)

Scorpæna rosea, *Day, P. Z. S.* 1867, p. 703; *Fish. India*, p. 151, pl. xxxvi, fig. 4.

D. 11 | 1/9-10. P. 6+xii. A. 3/5. C. 15. L. l. 43. L. tr. 7/18.

Length of head 5, height of body 3 in the total length. *Eyes*—somewhat elevated, with a deep groove below, and anterior and posterior depressions; interorbital space deeply concave, with an elevated smooth ridge on either side; diameter of eyes 4 in length of head, $1\frac{3}{4}$ from end of snout, and $\frac{3}{4}$ apart. Snout rather elevated; a broad fleshy fringed tentacle to the anterior nostril. Above the angle of the preopercle is a ridge with five more backwardly directed spines. Along the angle and lower edge of the preopercle are three denticulations, the superior strong and sharp, the others

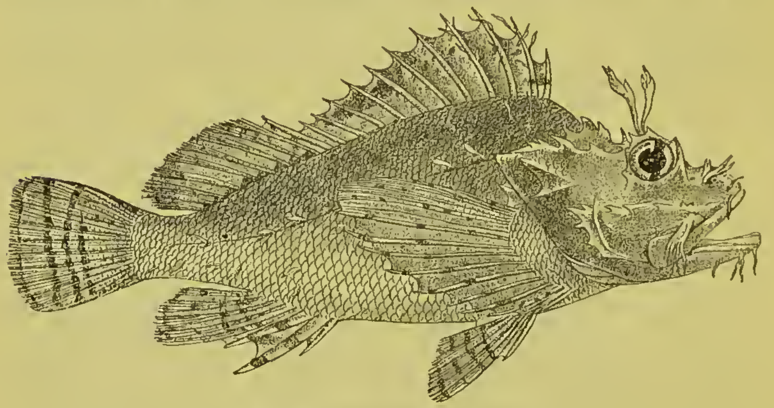

Fig. 22.—*Scorpænopsis rosea.*

blunted; also three fleshy tentacles along its border and one on its surface. Interopercle with a blunt spine and tentacle. Opercle with a central bony ridge ending in two spines. Temporal and occipital ridges spiny. Orbit with a strong spine at its posterior upper, and another at its superior, edge, the last with a long wide tentacle at its base. Several fleshy tentacles on the snout, a large one at the angle of the mouth, and two on the end of the upper jaw; also three rather large ones on the lower jaw. *Fins*—dorsal spines moderately strong, the third the longest, interspinous membrane rather deeply cleft and extended beyond each spine. Pectoral with its lowest twelve rays unbranched and minute fleshy appendages attached to them. Second and third anal

spines of equal length, the former much the stronger. Caudal cut nearly square. *Scales*—present, some on the upper part of the opercle; head otherwise scaleless. *Colour*—rosy, marbled with greyish; one or two irregular vertical grey bands on the caudal fin; dorsal, anal, and ventral also banded; pectoral with numerous dark spots.

Hab. Madras.

801. (5.) Scorpænopsis venosa.

Scorpæna venosa, *Cuv. & Val. H. N. Poiss.* iv, p. 317.
Scorpænopsis venosa, *Day, Fish. India*, p. 151.

D. 11 | 1/10. P. 9+x. V. 1/5. A. 3/5. C. 16. L. r. 55/45. L. tr. 9/25.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and about 1 apart. Interorbital space very concave, with two longitudinal ridges that end posteriorly in spines; a groove before the eyes; a quadrangular space on the vertex bordered by spines; turbinal and preorbital spines, a spiny ridge across the cheeks; vertical margin of opercle, occipital and temporal ridges spiny. *Tentacles*—none apparent over orbit (?); very distinct on lower jaw and different parts of head. Valenciennes observes that the most remarkable character is that all the skin of the head between the spines is as if it were veined with small scooped-out lines which join on all sides, and thus form a network which has the appearance of scales. *Fins*—4th dorsal spine longest and equal to second anal, which is $\frac{2}{5}$ length of head. *Scales*—none on head. *Colour*—"head and body dark, with a mixture of dull red; the throat and belly are of a pink colour. The fins irregularly streaked black and red; the ventral at its root is pink like the belly" (*Russell*).

Hab. Coromandel coast of India.

4. Genus **PTEROIS**, Cuv.

Syn. *Pseudomonopterus*, Klein; *Macrochyrus*, *Pteroleptus*, *Pteropterus*, and *Brachyrus*, Swainson.

Branchiostegals seven; pseudobranchiæ. Head rather large, armed with spines and having skinny flaps; no occipital groove. Villiform teeth in jaws and on vomer, none on the palate. A single deeply notched dorsal fin, having from twelve to thirteen spines; anal with two or three spines and few rays; rays, and sometimes spines, elongate; no pectoral appendages. Air-bladder large. Pyloric appendages few.

Geographical Distribution. Indian and Pacific Oceans within the tropics.

No great value can be attached to the comparative length of the dorsal spines or pectoral rays in this genus of fishes, as the spines and rays are subject to considerable variation in specimens of the same species. It has yet to be ascertained whether the orbital tentacle is equally developed in both sexes.

Synopsis of Indian Species.

A. Dorsal spines 12.
  a. Interorbital space scaly.
    Caudal unspotted . . . . 1. *P. russellii*, p. 60.
    Caudal spotted . . . . 2. *P. miles*, p. 61.
  b. Interorbital space without scales.
    Caudal banded . . . . 3. *P. zebra*, p. 61.
    Caudal spotted . . . . 4. *P. volitans*, p. 62.
B. Dorsal spines 11 . . . . 5. *P. radiata*, p. 63.

802. (1.) Pterois russellii. (Fig. 23.)

Pterois russellii (*Van Hass.*), *Bennett, P. Z. S.* 1831, p. 128; *Day, Fish. India*, p. 152, pl. xxxvi, fig. 5 (see synon.).

Tambi or *Sin toumbi*, Tamil.

D. 12 | 1/11–12. P. 13. A. 3/7–8. C. 14. L. r. 71/66. L. tr. 11/33.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{3}{4}$ diam. from end of snout, and $\frac{3}{4}$ apart. A spiny ridge traverses the preorbital and continues over the cheek to upper preopercular spine, below which there are two or three more on the vertical, and two along the horizontal edge.

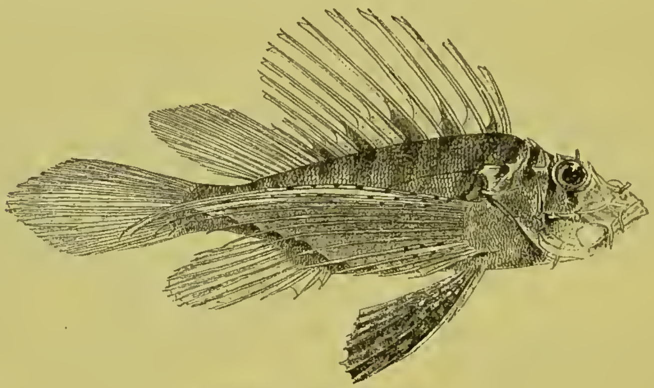

Fig. 23.—*Pterois russellii.*

A spine at posterior upper angle of orbit and a short supraorbital tentacle. Interorbital space deeply concave, it and occiput scaled. Occipital and temporal ridges spiny; a small turbinal spine. A rather long fleshy tentacle at angle of preorbital, one at anterior nostril, and several more about the head. *Fins*—dorsal spines increase in length to 5th, which equals height of body and is longer than rays; the pectoral, with its membrane, especially between its four upper rays, deeply cleft, reaches a little beyond base of caudal or even further; ventral extends to anal rays; third anal spine longest; caudal pointed. *Colour*—reddish, with 11 or 12 borad dark vertical bands, with intermediate narrow ones. A black spot on shoulder behind opercle, no white spot in axilla

Pectoral grey, its upper two rays with black spots, its lowest five pinkish, in the adult all are spotted; ventrals grey, with obscurely marked white spots; dorsal spines grey, or white annulated with grey. Soft dorsal, caudal, and anal flesh-coloured without spots, but having in adults a narrow black edge.

Hab. Seas of India, Mauritius to the Malay Archipelago. Very common in Madras, especially about June; attaining at least to $11\frac{1}{2}$ inches.

803. (2.) Pterois miles.

Scorpæna miles, *Bennett, Fish. Ceylon*, p. 9, pl. 9.
Pterois miles, *Day, Fish. India*, p. 153, pl. xxxvii, fig. 2 (see synon.).

Kurrun toombi, Tam., "Flying Dragon;" *Ratoo gini maha*, Cing.

D. 12 | 1/10–11. P. 14. A. 3/6–7. L. r. 92. L. tr. 12/—. Vert. 10/14.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of the head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Lower third of preorbital covered with spiny elevations, which are continued across cheeks to angle of preopercle, where they end in spines; two strong turbinal spines; interorbital space convex but not very deeply so; upper edge of orbit, temporal and occipital ridges spiny. A short orbital tentacle, one at the anterior nostril, a long preorbital one over angle of mouth, and other short ones about the head. *Fins*—dorsal spines highest from 6th to 12th, which equal height of body and are longer than rays; pectoral with interradial membrane most deeply cleft between first three rays, and reaching to below end of base of dorsal or further; ventral reaches anal, the third spine of which is longest; caudal wedge-shaped. *Scales*—present in the interorbital space and on the nape. *Colour*—red, with many dark vertical bands much wider than the ground-colour, which in the first two thirds of the body appears like narrow light bands; in the last third the dark bands are wider apart. Head with bands mostly radiating from eye, two of an S-shape on chest. A white spot surrounded by black in axilla. Dorsal spines with five or six dark rings. Soft dorsal, caudal,and anal covered with small black spots; pectoral with large black blotches on a lighter ground; ventral nearly black, with white and light brown spots.

Hab. Red Sea, seas of India, the Malay Archipelago and beyond. The largest specimen captured at Madras measured 14 inches. In a specimen 9 inches long the pectoral reaches the root of the caudal.

804. (3.) Pterois zebra.

Pterois zebra, *Cuv. & Val. H. N. Poiss.* iv, p. 367; *Day, Fish. India*, p. 153 (see synon.).

D. 12 | 1/11. P. 17. A. 3/6–7. C. 14. L. r. 55–50. L. tr. 9/—.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*

—diameter $3\frac{1}{2}$ in length of head (in a specimen $3\frac{1}{2}$ inches long), 1 diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space scaleless, deeply concave, traversed by two low ridges ending behind in a strong spine. Preopercle with three spines on its vertical border; turbinal spines present. Two or three spines along the upper edge of the orbit, its hind margin likewise serrated. Ridges in a stellate form on the preorbital, one is continued backwards across the suborbitals and cheeks to the superior preopercular spine; spines on occipital and temporal ridge. A long orbital tentacle more than half length of head; fleshy tentacles along lower edge of preorbital, the hind one over angle of mouth very large. *Fins*—dorsal spines increase in length to the seventh, remaining about equal to the tenth, or as long as the height of the body and higher than the rays; the upper four pectoral rays with filamentous prolongations, and reaching base of caudal; ventrals reach anal spines, the third of which is slightly the longest; caudal wedge-shaped. *Colour*—body vertically banded; a black blotch with a white central spot in the axilla; dorsal spines annulated with black; soft dorsal and anal with black spots in irregular lines; four or five sinuous vertical bands on the caudal; pectoral and ventral with black transverse bands and lines as wide as the ground-colour or wider.

Hab. Seas of India to the Malay Archipelago and beyond. I have this species from the Andamans.

805. (4.) Pterois volitans.

Gasterosteus volitans, *Linn. Syst. Nat.* i, p. 491.
Pterois volitans, *Day, Fish. India*, p. 154, pl. xxxvii, fig. 1 (see synon.).

Kombada, Maráthi; *Purrooah*, Mal.; *Cheeb-ta-ta-dah*, Andam.

D. 12 | 1/10–11. P. 14. A. 2–3/7–6. L. r. 90. L. tr. 13/. Cæc. pyl. 3.

Length of head $3\frac{2}{3}$ to $4\frac{1}{3}$, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to $1\frac{1}{3}$ diam. from end of snout, and 1 apart. Interorbital space deeply concave, it and the nape scaleless, or with some very rudimentary scales; it is traversed by two low ridges which do not terminate posteriorly in spines. Preopercle with spines on its vertical border and lower limb; turbinal spines present; upper edge of orbit, occipital ridge, temporal ridge, and lower margin of preorbital spiny, and a raised line, sometimes almost spiny, runs across the cheeks from preorbital to upper preopercular spine. Opercular spine but slightly developed. A long tentacle from upper edge of the orbit about half the length of the head; also fleshy tentacles along the lower edge of the preorbital, the hindmost largest. *Fins*—the first ten dorsal spines are high, and equal to the height of the body, or one half more, the interspinous membrane deeply emarginate; soft portion of fin not so high as spinous; pectoral reaching to the root of caudal or beyond, membrane between upper four rays deeply

cleft; ventrals reach anal rays; third anal spine longest, three fourths as high as the first dorsal spine; caudal rather rounded or wedge-shaped. *Colour*—reddish, with vertical brown bands and narrow pale lines intervening; three or four broad stripes radiate from the eye; one passes over the nape. A black mark in the axilla, having a pure white spot in its centre. Dorsal spines annulated with black; soft dorsal, caudal, and anal spotted; pectoral greyish with light coloured spots; ventral slate-coloured with white spots.

Hab. Red Sea, east coast of Africa, through the seas of India to Australia.

806. (5.) Pterois radiata.

Pterois radiata (*Park.*), *Cuv. & Val. H. N. Poiss.* iv, p. 369.
Pterois cincta, *Rüppell, N. W., Fische*, p. 103, t. 26, fig. 3; *Day, Fish. India*, p. 151, pl. xxxvii, fig. 3, *Suppl.* p. 788 (see synon.).

D. 11 | 1/11–12. P. 16. A. 3/6. C. 15. L. l. 25. L. r. 45. L. tr. 7/25.

Length of head $3\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space very concave. Tentacle above the orbit long, and reaching as far as the end of the snout. Margin of orbit serrated; occipital and temporal ridges spiny; other bones about the head comparatively feebly armed; several fleshy tentacles on the head; long ones on the snout. *Fins*—eighth to ninth dorsal spines the highest; pectoral reaches end of caudal. *Scales*—on nape. *Colour*—snout uncoloured; a deep brown band edged with white extends from the eye to the angle of the interopercle; the second encircles the neck, and there are six more on the body, which looks as if it were traversed vertically by narrow milk-white bands. A dark band at the base of the pectoral, which is also stained in its outer half; a blackish mark in the axilla without any white spot. Ventral greyish, its spine white; caudal spotted.

Hab. Red Sea, Andamans to the Malay Archipelago and beyond.

5. Genus APISTUS, Cuv.

Syn. *Pterichthys*, Swainson; *Polemius*, Kaup.

Branchiostegals six. Head and body rather compressed. No groove across occiput. Strong and sharp preorbital and preopercular spines; opercles armed. A mandibular barbel. Villiform teeth in jaws, vomer, and palate. A single dorsal fin with more spines than rays; three anal spines; pectoral elongate and having a free ray at its base. Articulated fin-rays branched. Scales present. Air-bladder with a constriction. A cleft behind the fourth gill.

Geographical Distribution. From the Red Sea through the seas of India.

807. (1.) **Apistus carinatus.** (Fig. 24.)

Scorpæna carinata, *Bl. Schn. Syst. Ich.* p. 193.
Apistus carinatus, *Day, Fish. India*, p. 155, pl. xxxvii, fig. 4 (see synon.).

D. 14–16/9. P. 12+i. V. 1/5. A. 3/7. C. 12. L. r. 70.

Length of head from $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body 4 to $4\frac{1}{3}$ in the total length. *Eyes*—directed slightly upwards and outwards, diameter $3\frac{1}{2}$ to 4 in length of head, rather above 1 diam. from end of snout, and $\frac{1}{3}$ apart. Upper surface of the head rugose, with two divergent lines passing from snout between eyes to occiput, where they terminate in small spines a little in front of either side of base of dorsal fin. *Barbels*—a long slender one, equalling diameter of eye, below mandibular symphysis, and another a short distance behind it. *Fins*—dorsal spines increase to 6th, then decrease to 14th; membrane deeply notched; pectoral reaching to base of last dorsal ray, its single appendage to first of anal; third

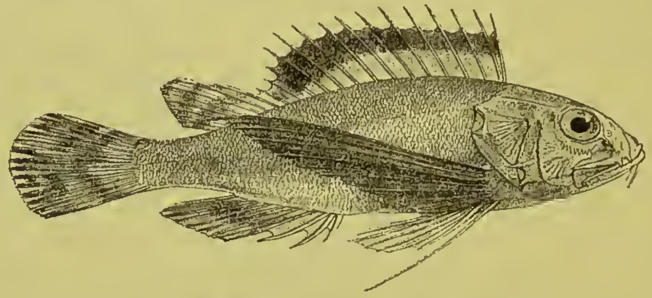

Fig. 24.—*Apistus carinatus.*

anal spine longest; caudal cut square. *Scales*—small, somewhat trefoil in shape. *Colour*—body greyish along the back, becoming rosy on the abdomen; pectorals deep black; appendage milk-white; dorsal diaphanous, tinged with grey and edged with black; a deep black blotch from 8th to 14th spine; three oblique brownish streaks on the soft dorsal, which also has a brown edging; upper pectoral ray white; caudal with four vertical black bands; anal greyish, with a yellow horizontal band.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining 5 inches in length.

6. Genus **CENTROPOGON**, Günther.

Syn. *Gymnapistes*, sp., Swainson.

Branchiostegals six or seven. Head and body rather strongly compressed; no groove on occiput. Preorbital with a strong spine, preopercle likewise spiniferous; opercle armed. Villiform teeth in the jaws, vomer, and palatine bones. A single dorsal fin with more spines than rays (D. 14–15/7–9); anal with three spines;

pectoral without any free rays at its base; articulated fin-rays branched. Scales present. (A narrow cleft behind the fourth gill.)

Geographical Distribution. Seas of India to the Malay Archipelago and beyond.

808. (1.) **Centropogon indicus.** (Fig. 25.)

Centropogon indicus, *Day, Fish. India,* p. 155, pl. xxxviii, fig. 2.

B. vii. D. 14/8. P. 10. V. 1/4. A. 3/5. C. 14. L. r. 80.

Length of head $3\frac{1}{3}$, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space slightly concave, traversed by two ridges which posteriorly have rather spiny terminations. Preorbital with a strong spine extending to below hind edge of eye. A strong preopercular spine equal to two thirds of the diameter of the orbit in length. *Fins*—second and third dorsal spines the longest,

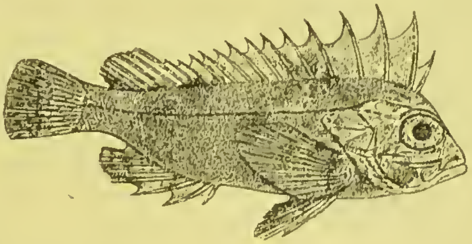

Fig. 25.—*Centropogon indicus.*

longer also than the rays; third anal spine considerably the longest and equal in length to the highest in the dorsal fin; caudal slightly rounded. *Colour*—pinkish with irregular markings over the head, the cheeks barred with pinkish and brown vertical bands; three or four badly defined vertical bars on the body, the last being over base of caudal; a vertical brown band over last third of caudal, and posterior third of anal banded; ventral nearly black in its last half.

Hab. Madras; growing at least to $2\frac{1}{2}$ inches in length.

7. Genus **GYMNAPISTUS**, Swains.

Syn. *Apistus*, sp., Cuv. & Val.; *Trichosomus*, sp., Swainson; *Prosopodasys*, Günther.

Branchiostegals six. Head and body somewhat compressed; no groove across the occiput. Preorbital and preopercle with strong, sharp spines; opercle armed. Villiform teeth in jaws, vomer, and palate. Dorsal fin formed of two portions, the first of three spines which are connected by membrane with the second, the spines in greater number than the rays; three anal spines;

pectoral without any free rays at its base; articulated fin-rays branched. Scales rudimentary or absent.

Geographical Distribution. Indian Ocean.

Synopsis of Indian Species.

Nearly black	1. *G. niger*, p. 66.
Greyish brown, with a black blotch on the dorsal fin	2. *G. dracæna*, p. 67.

809. (1.) **Gymnapistus niger.** (Fig. 26.)

Apistus niger, *Cuv. & Val. H. N. Poiss.* iv, p. 415.
Gymnapistus niger, *Day, Fish. India*, p. 156, pl. xxxvii, fig. 5 (see synon.).

Pom-tho-cho-roguc-dah, Andam.

B. vi. D. 3 | 9–10/8. P. 10. V. 1/5. A. 3/7. C. 9.

Length of head $3\frac{1}{3}$, height of body 3 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Interorbital space slightly concave. *Fins*—first dorsal commences over hind third of orbit, interspinous membrane of the two fins continuous, the second spine is two thirds as high as the body; there is a short interspace between the two fins; the rayed portion is of equal height with the second part of the spinous; a membranous prolongation goes from the end of tho fin nearly to the

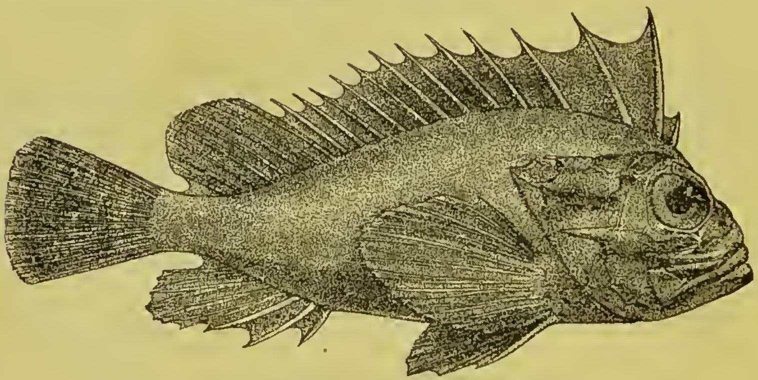

Fig. 26.—*Gymnapistus niger.*

base of the caudal; third anal spine longer but weaker than the second; caudal cut square. *Scales*—absent except in the form of roughnesses here and there in the skin. *Colour*—brownish black; caudal yellowish white, striated with brown and having a dark band in its last fourth and a white external edge.

Hab. Seas of India to the Malay Archipelago; very numerous at the Andamans. The natives assert that wounds from the spines are exceedingly venomous.

810. (2.) Gymnapistus dracæna.

Apistus dracæna, *Cuv. & Val. H. N. Poiss.* iv, p. 403.
Gymnapistus dracæna, *Day, Fish. India,* p. 156, pl. xxxviii, fig. 1 (see synon.).

B. vi. D. 3 | 8-9/7-8. P. 13. V. 1/5. A. 3/5-6. C. 13.

Length of head $3\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter 4 in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{2}{3}$ apart. Lower jaw the longer and having a tubercle at the symphysis. *Fins*—dorsal spines sharp but slender; the first arises over middle of eye, the second or third spine the longest, equalling half the height of body, all three longer than spines of second dorsal; membrane deeply notched between the two dorsals. Pectoral reaching to above middle rays of anal; ventral reaches the anal spines, the third of which is the longest; caudal cut almost square. *Scales*—rudimentary. *Colour*—greyish brown, a black blotch on dorsal fin between the 3rd or 4th and 7th or 9th spines; soft dorsal nearly black in last three-fourths; pectoral blackish, as is also outer half of ventral and anal; caudal yellowish white, with some small brown spots.

Hab. Common in the seas of Western India and Ceylon, especially off Canara, where it attains 3 inches in length.

8. Genus **AMBLYAPISTUS**, Bleeker.

Syn. *Apistus,* sp., Cuv. & Val.; *Platypterus,* Swainson.

Branchiostegals five or six. Head and body strongly compressed; no groove across occiput. Strong and sharp preorbital and preopercular spines; opercle armed. Villiform teeth in jaws, vomer, and palate. A single dorsal fin with more spines than rays, generally elevated anteriorly; three anal spines; pectoral without any free ray at its base. Articulated fin-rays branched. Scales, if present, rudimentary. Air-bladder present. Pyloric appendages few.

Synopsis of Indian Species.

A. Dorsal fin begins above the eyes; caudal rounded or square.
- Dorsal fin slightly connected with caudal 1. *A. tænianotus,* p. 67.
- Dorsal fin quite distinct from caudal .. 2. *A. longispinis,* p. 68.

B. Dorsal fin begins in front of eyes; caudal pointed .... 3. *A. macracanthus,* p. 68.

811. (1.) Amblyapistus tænianotus.

Apistus tænianotus, *Cuv. & Val. H. N. Poiss.* iv, p. 404.
Amblyapistus tænianotus, *Day, Fish. India,* p. 157, pl. xxxviii, fig. 5 (see synon.).

B. v. D. 17-16/8-7. P. 12. V. 1/5. A. 3/5-7. C. 12.

Length of head $4\frac{1}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, nearly 1 diam. from end of snout and $\frac{3}{4}$ apart. The profile from snout to commencement of dorsal fin almost vertical. *Fins*—dorsal commencing between the eyes, high anteriorly, its first spine short, its second as high as the body, its third a little shorter; from about the fourth spine to the end of the rays all are of about the same height; a slight membranous continuation between the end of the dorsal and base of the caudal fins; third anal spine longest; caudal slightly rounded. *Lateral line*—first sixteen tubules distinct, subsequently they coalesce into one tube. *Colour*—reddish, with irregular brownish spots, a brown mark between the 5th and 6th or 7th dorsal spines.

Hab. Andaman Islands, Malay Archipelago and beyond; attaining a few inches in length.

812. (2.) Amblyapistus longispinis.

Apistus longispinis, *Cuv. & Val. H. N. Poiss.* iv, p. 408.
Amblyapistus longispinis, *Day, Fish. India*, p. 157, pl. xxxviii, fig. 4 (see synon.).

B. vi. D. 13–15/6–8. V. 1/4. A. 3/4–5. C. 12.

Length of head $3\frac{3}{4}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and nearly 1 apart. A rise from the snout to the base of the dorsal fin at about 45°. The maxilla reaches to below the middle of the orbit; lower jaw slightly the longer. *Fins*—dorsal spines commencing over eye, interspinous membrane deeply emarginate; first spine as long as snout from middle of eye, second and third equal, and as long as head excluding snout, last eight spines of about the same height as the rays; third anal spine longest; caudal cut square. *Scales*—rudimentary, but distinct. *Lateral line*—with 20 tubes. *Colour*—pinkish, a brown spot on lateral line below the seventh dorsal spine, and a white one above and behind it; fins with brown spots, end of caudal blackish.

Hab. Seas of India to China; attaining a few inches in length.

813. (3.) Amblyapistus macracanthus. (Fig. 27.)

Apistus macracanthus, *Bleeker, Batav. Nat. Tijdsch.* iii, p. 267.
Amblyapistus macracanthus, *Day, Fish. India*, p. 158, pl. xxxviii, fig. 3 (see synon.).

B. vi. D. 15–16/9–10. P. 12. V. 1/5. A. 3/8. C. 12.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Body strongly compressed. *Fins*—dorsal fin commences before the eyes, is high anteriorly; the first three spines at some distance from the others, second spine the highest, being nearly as high as the body, the last spine as high as the rays; a slight membranous connection between the dorsal and caudal;

third anal spine longest; caudal pointed, its lower border truncated. *Scales*—a few small ones imbedded in the skin on the body. *Colour*—brownish black; pectoral with a white border.

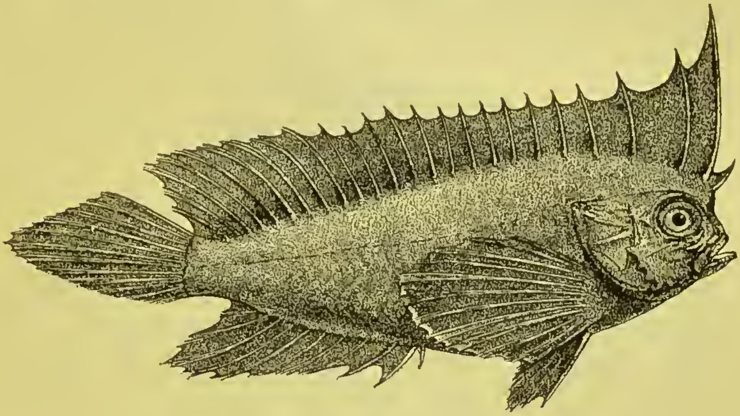

Fig. 27.—*Amblyapistus macracanthus.*

Hab. Andamans and Malay Archipelago; attaining to at least $3\frac{1}{2}$ inches in length.

9. Genus MICROPUS, Gray.

Syn. *Caracanthus*, Kröyer; *Amphiprionichthys*, Bleeker; *Centropus*, Kner; *Crossoderma*, Guichenot.

Branchiostegals four to six. Body strongly compressed, short and deep. Preorbital, pre-, sub-, and interopercles armed. Villiform teeth in the jaws only. One or two dorsal fins, the first with seven or eight spines, the anal with two; no free pectoral rays; ventrals rudimentary; some of the articulated fin-rays branched. Body scaleless, but covered with small tubercles. (No cleft behind the fourth gill.)

Geographical Distribution. Small fishes distributed through the seas of India to the Malay Archipelago and Pacific.

814. (1.) Micropus zeylonicus. (Fig. 28.)

Amphiprionichthys zeylonensis, *Day, P. Z. S.* 1869, p. 515.
Micropus zeylonicus, *Day, Fish. India*, p. 158, pl. xxxviii, fig. 6 (see synon.).

B. vi. D. 7/14. P. 13. V. 1/3 ?. A. 2/11. C. 15.

Length of head nearly 3, height of body 2 to $2\frac{1}{4}$ in the total length. *Eyes*—high up, $1\frac{1}{2}$ diameters from end of snout and 1 apart. Preopercle with five blunt spines. A serrated ridge passes from the back of the orbit towards the occiput. *Fins*—dorsal fin has a notch between its two portions, the third and

fourth spines the highest; rays not so high as spines; anal spines with a deep notch in the membrane separating them from the rays. *Colour*—bluish along upper half of body, becoming dirty brown on the abdomen; several irregular rows of yellowish blotches along

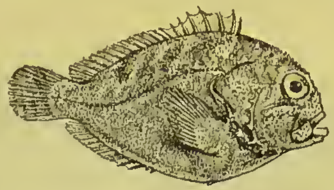

Fig. 28.—*Micropus zeylonicus.*

the back and sides, separated by a darker reticulation; fins light-coloured, caudal marked like sides of body.

Hab. Malabar and Ceylon; the largest obtained was $2\frac{1}{2}$ inches in length.

10. Genus **MINOUS**, Cuv. & Val.

Syn. *Corythobatus*, sp., Cantor.

Branchiostegals seven. Head large, body rather compressed; a groove across occiput. Preorbital with a strong spine, preopercle likewise spinate; opercle armed. Villiform teeth on jaws and vomer, palatines edentulous. A single dorsal fin with about the same number of spines as rays; anal spines, if present, badly developed; pectoral with a free ray at its base. Articulated fin-rays single, unbranched. Scales absent. Cæcal appendages few. (A cleft behind the fourth gill.)

815. (1.) **Minous monodactylus.** (Fig. 29.)

Scorpæna monodactyla, *Bl. Schn. Syst. Ich.* p. 194.
Minous monodactylus, *Day, Fish. India*, p. 159, pl. xxxviii, fig. 7 (see synon.).

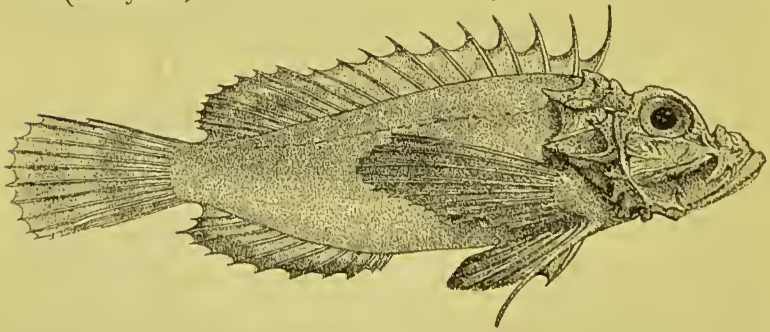

Fig. 29.—*Minous monodactylus.*

Dhoma, Maráthi; *Cul-plaachee*, Tam.

D. 9–11/12–9. P. 10+i. V. 1/5. A. 9–11. C. 10. Cæc. pyl. 4.

Length of head $3\frac{1}{2}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. *Fins*—dorsal spines moderately strong, the first distinct from the remainder, the membrane deeply cleft. *Colour*—head greyish brown above, sides and abdomen lighter or flesh-coloured, with dark blotches and marks; dorsal fin light brown margined with black; pectoral black, its appendages white; caudal buff, with three vertical brown bars.

Hab. Seas of India to China; attaining 4 or 5 inches in length.

11. Genus **COCOTROPUS**, Kaup.

Syn. *Corythobatus*, sp., Cantor; *Tetraroge*, pt., Günther.

Branchiostegals six. Head and body strongly compressed; no groove across the occiput. Preorbital with a strong blunt spine; preopercle with a similar one; opercle armed. Villiform teeth in jaws and vomer, palatines edentulous. A single dorsal fin with more spines than rays; two weak anal spines; pectoral without any free ray at its base. Articulated fin-rays single, unbranched. Scales absent.

Synopsis of Indian Species.

D. 13/11, P. 11; first dorsal spine longest ...... 1. *C. echinatus*, p. 71.
D. 14–15/9–10, P. 14; second dorsal spine longest. 2. *C. roseus*, p. 71.

816. (1.) Cocotropus echinatus.

Corythobatus echinatus, *Cantor, J. A. S. B.* xviii, p. 1027; *Catal. Mal. Fish.* p. 45, pl. 13.
Cocotropus echinatus, *Day, Fish. India*, p. 159 (see synon.).

D. 13/11. P. 11. V. 1/3. A. 2/8. C. 12.

Length of head $3\frac{3}{5}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—near the dorsal profile, diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{3}{4}$ apart. The anterior profile from dorsal fin to snout almost vertical. *Fins*—dorsal commences over orbit, first spine rather curved and longest, the last spines as high as the rays; from end of dorsal a membranous continuation extends to base of caudal. Caudal rounded. Body and head studded with small obtuse prickles. *Lateral line*—indistinct. *Colour*—buff, with five brown lines radiating from the eye; dorsal fin reddish with its upper edge purple; fins generally reddish or yellow, the pectoral with three light vertical bands on its basal half; some large brownish blotches in the upper half of the body.

Hab. Andamans and Pinang; attaining a few inches in length.

817. (2.) Cocotropus roseus. (Fig. 30.)

Cocotropus roseus, *Day, Fish. India*, p. 160, pl. xxxviii, fig. 8 (see synon.).

D. 14–15/9–10. P. 14. V. 1/3. A. 2/7–8. C. 12.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—placed high up, diameter 4 in length of head, $1\frac{3}{4}$ diam. from end of snout, and $\frac{3}{4}$ apart. Profile from dorsal fin to snout oblique. A rough ridge passes across the suborbitals to a little above the angle of the preopercle; an elevated occipital ridge, and also a temporal one having three blunt spines. *Fins*—dorsal fin commences over the middle of the eye; spines strong, the second slightly the longest, they subsequently slightly decrease to the last, which is as high as the first ray; a membranous extension from end of dorsal nearly reaches base of caudal. Caudal rounded.

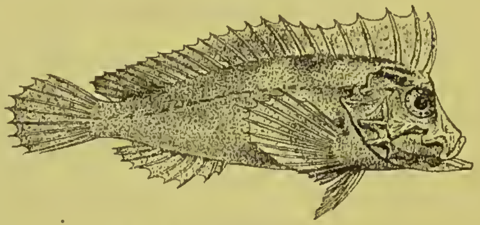

Fig. 30.—*Cocotropus roseus.*

Skin with many widely spread rough elevations, becoming somewhat spiny in large specimens; tubes of lateral line 10 or 11 in number, occupying its whole length. *Colour*—fleshy, the fins more pinkish. Dorsal fin edged with white, having a dull grey band along its centre, and most distinct in its last half; caudal edged with white, and numerous grey spots at the base; pectoral and anal reddish, the former with many black spots; ventrals white.

These fish are very common in Madras in October and through the cold months, but rarely exceed $2\frac{1}{2}$ or 3 inches in length.

Hab. Coromandel coast of India.

12. Genus **PELOR**, Cuv. & Val.

Branchiostegals seven. Head irregularly shaped. Villiform teeth in the jaws and vomer. The first three dorsal spines connected by membrane and at a little distance from the others (12–14), which are somewhat isolated, the interspinous membrane being deeply cleft; two free rays at the base of the pectoral fin, having a connecting membrane; ventrals thoracic. Articulated fin-rays branched. Scales absent. Head, body, and fins with skinny appendages. Air-bladder small. Pyloric appendages few.

818. (1.) **Pelor didactylum.** (Fig. 31.)

Scorpæna didactyla, *Pallas, Spic. Zool.* fasc. vii, p. 26, t. 4.
Pelor didactylum, *Günther, Catal.* ii, p. 150; *Day, Fish. India* p. 160, pl. xxxix, fig. 1 (see synon.).

D. 3 | 13–15/8–9. P. 10+ii. V. 1/5. A. 11–12. C. 12.

Length of head $3\frac{1}{2}$ to 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ in the adult to 3 in the young in length of head, $2\frac{1}{2}$ diam. from end of snout, and from 1 to $1\frac{1}{4}$ apart. Lower jaw considerably the longer. Interorbital space deeply concave, with a transverse ridge between the two eyes; a deep saddle-shaped depression across the occiput; a groove below the eyes. Upper edge of orbit with blunt spines; spiny occipital and temporal ridges; preopercle with spines on its vertical border; a suborbital spiny ridge; a turbinal spine; opercle mostly with two spines.

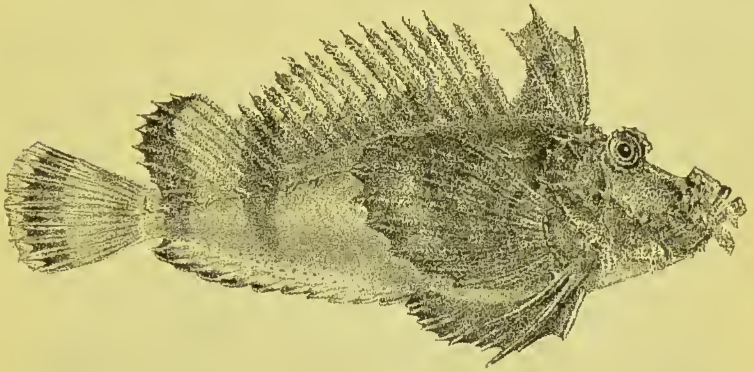

Fig. 31.—*Pelor didactylum.*

Rather long fleshy tentacles on the lower jaw. *Fins*—second dorsal spine somewhat longest of first three, as high as longest in rest of fin; interspinous membrane deeply cleft and covered with skinny appendages. Caudal cut almost square. *Colour*—brownish grey, becoming dirty white beneath, with fine spots over the body and head. Dorsal coloured like the body, a dark band passes down last few spines on to body, and another over last few rays takes the same course; caudal yellow, with a dark vertical band across its base, and another in its last third; outer edge of anal dark coloured.

Hab. Andaman Islands, to the Malay Archipelago and beyond.

13. Genus **CHORIDACTYLUS**, Richardson.

Branchiostegals six. Head and body compressed. Bones of head with osseous ridges; the preorbital, preopercle, and opercle with spines; a groove on the occiput. Villiform teeth on the jaws; palate edentulous. A single dorsal fin with more spines (13) than rays (9); anal with two spines; pectoral fin with three free rays. V. 1/5. Articulated fin-rays branched. Scales absent; some skinny appendages on the body. Air-bladder absent. Pyloric appendages few.

Geographical Distribution. Coromandel coast of India and seas of China.

819. (1.) **Choridactylus multibarbis.** (Fig. 32.)

Choridactylus multibarbis, *Richardson, Voy. Samarang, Fishes*, p. 8, pl. 2, figs. 1–3; *Day, Fish. India*, p. 161, pl. xxxix, fig. 2 (see synon.).

D. 13/9. P. 9+iii. V. 1/5. A. 2/8. C. 15.

Length of head 4, height of body 3½ in the total length. *Eyes*—high up, with prominent orbits, diameter 3½ in length of head, 1 diam. from end of snout, and rather more apart. Interorbital space concave, with two longitudinal ridges, connected behind by a transverse one. A fleshy tentacle over the centre of the eye, and some tentacles on the mandible. *Fins*—dorsal commencing just behind the eyes, the first three spines somewhat removed from the rest, the fourth likewise at some distance from those before or behind it, the third and fourth spines the longest; interspinous membrane deeply emarginate; rays a little higher than the longest spine; ventral large, nearly the whole of its inner edge attached by

Fig. 32.—*Choridactylus multibarbis.*

a skinny flap to the abdomen; anal spines small, the second one-third the longest; caudal rounded. *Colour*—brownish, with a yellow shoulder-mark, and two or three vertical orange bands; base of ventral and anal with fine white spots. Fins blackish brown, with a light band between the fourth and sixth dorsal spines; margins of pectoral orange; caudal with a black band at its base, and another in its last third having a light edge; outer two thirds of anal blackish; free rays black, with white in their middle.

Hab. Coromandel coast of India, and China. This fish is very common at Madras, attaining about 4 inches in length.

14. Genus **SYNANCIDIUM**, Müll.

Syn. *Buffichthys*, Swains.

Branchiostegals seven. Head monstrous and irregularly shaped, but without sharp spines. Villiform teeth on the jaws and vomer,

but not on the palatines. The soft dorsal continuous with the spinous, fewer rays than spines; anal 3/5; no pectoral appendages. Scales absent; body and sometimes the head with skinny flaps. Air-bladder small. Pyloric appendages few.

820. (1.) Synancidium horridum. (Fig. 33.)

Scorpæna horrida, *Linn. Syst. Nat.* i, p. 453.
Synancidium horridum, *Day, Fish. India*, p. 162, pl. xxxix, fig. 3.

D. 12–13/6–7. P. 16. V. 1/5. C. 12. Cæc. pyl. 3. Vert. 10/14.

Length of head 3, height of body 3 in the total length. *Eyes*—diameter 8 in length of head, 3 diam. from end of snout. Crown of head irregularly saddle-shaped; a deep groove on the cheeks, orbit raised. *Fins*—dorsal spines stiff, the first three the highest and somewhat separated from the others; vertical fins more or

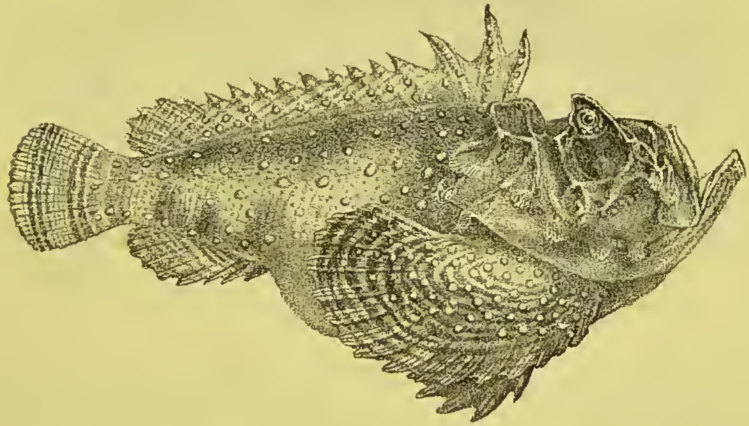

Fig. 33.—*Synancidium horridum.*

less enclosed in skin. Articulated fin-rays branched. Skin with numerous large and small tubercles even on the fins; some large fringed tubercles along lower edge of preopercle and preorbital. *Colour*—brownish fawn above, lighter below; irregular blotches on the body, and smaller ones on the fins.

Hab. Seas of India to the Malay Archipelago and beyond.

15. Genus SYNANCEIA, Bl. Schn.

Syn. *Synanceichthys*, Bleeker.

Branchiostegals seven. Head monstrous, irregularly shaped but spineless; no saddle-shaped fossa across the occiput; no transverse elevation between the orbits, nor deep groove below the eyes. Villiform teeth on the jaws; vomer and palatine bones edentulous. The soft dorsal continuous with the spinous, fewer rays than spines; anal 3/5, no pectoral appendages. Air-bladder present. Scales absent. Pyloric appendages few.

821. (1.) **Synanceia verrucosa.** (Fig. 34.)

Synanceia verrucosa, *Bl. Schn. Syst. Ich.* p. 195, t. 45; *Day, Fish. India*, p. 162, pl. xxxix, fig. 4 (see synon.).

D. 13/6–8. P. 1/8. V. 6. C. 10–12. Cæc. pyl. 0(4). Vert. 10/14.

Length of head $2\frac{1}{2}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter 6 to 7 in length of head and 2 diam. from end of snout. Interorbital space very concave; orbits but little elevated. A slight groove on the cheek. The anterior extremity of the lower jaw is on the dorsal profile. Body with cutaneous excrescences,

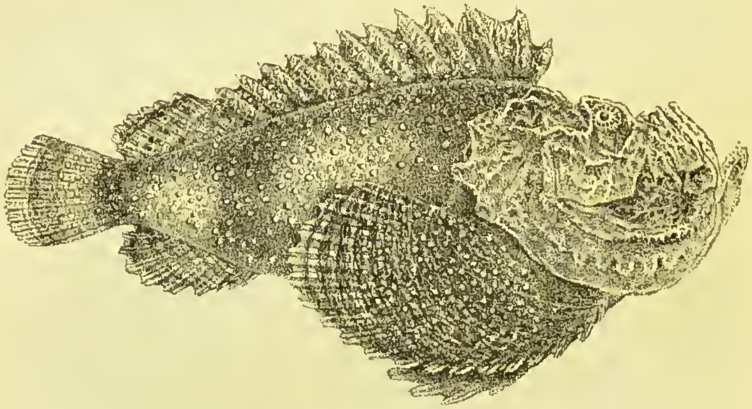

Fig. 34.—*Synanceia verrucosa.*

and many filaments about the head. *Colour*—brownish, caudal with a vertical dark band down its centre and white margins; pectoral and ventral with dark edges and light borders; anal banded.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 13 inches in length.

This species is well known at the Mauritius and dreaded on account of the wounds inflicted by its dorsal spines, each of which is grooved and has a small poison-bag attached. Men are said to have died as a result of the wounds.

16. Genus **LEPTOSYNANCEIA**, Bleeker.

Syn. *Pseudosynanceia*, Day.

Branchiostegals seven. Body elongate, anteriorly subcylindrical, posteriorly compressed; head broad, depressed. Eyes on the upper surface of the head, directed upwards. Preopercle and preorbital armed. Gill-opening with a superior as well as posterior orifice, the two being continuous. Villiform teeth in the jaws and on the vomer, none on the palate or tongue. A single dorsal fin

with 18 strong spines and 5 unbranched rays; anal with 3 spines and 7 rays. No pectoral appendage. Articulated fin-rays unbranched. Scales absent. Skin smooth.

Geographical Distribution. From Sind to the Malay Archipelago.

822. (1.) **Leptosynanceia melanostigma.** (Fig. 35.)

Pseudosynanceia melanostigma, *Day, Fish. India,* p. 163, pl. lv, fig. 6, *Suppl.* p. 788.

D. 16/5. P. 14. V. 1/3. A. 3/7. C. 11.

Length of head $4\frac{1}{3}$, height of body 6 in the total length. *Eyes*—diameter 7 in length of head, $1\frac{1}{2}$ diameters from end of snout, and 3 apart. Upper surface of the head with sinuous, but not spiny, ridges. Opercle with a spine. Lower jaw the longer, its symphysis forming a portion of the dorsal profile. *Fins*—dorsal spines strong, commencing over the centre of the opercle, the posterior ones being somewhat the longest but not so high as the rays; interspinous membrane deeply cleft. Anal spines short but

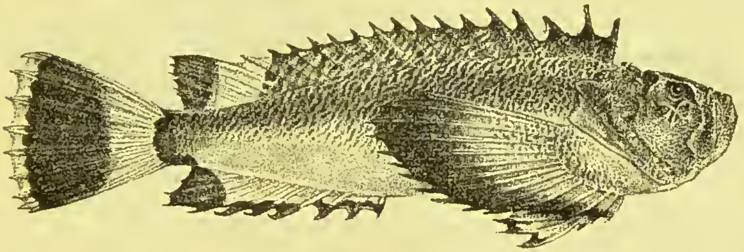

Fig. 35.—*Leptosynanceia melanostigma.*

pungent. No skinny tentacles on head, body, or fins. *Colour*—grey mottled with black on top of head and along back, becoming yellow on abdomen. Spinous dorsal also mottled, a vertical yellow band across front half of soft dorsal, its last half black. Pectoral yellow, with some grey spots at its base and a wide black edge. Ventral and anal yellow, edged with black. Caudal yellow, with a black band down the last half, externally edged with yellow.

Hab. Kurrachee, in Sind; growing to at least 7 inches in length. This fish lives in the mud and is difficult to obtain.

17. Genus **POLYCAULIS**, Günther.

Syn. *Synanceia,* sp., Bloch; *Trachicephalus,* Swainson.

Branchiostegals seven. Body anteriorly subcylindrical, posteriorly compressed; head broad, rather depressed. Eyes directed upwards. Preopercle armed. Gill-opening with a superior as well as posterior orifice, the two being continuous. Villiform teeth in the jaws, none on the vomer. A single dorsal fin with flexible

spines and rays; anal somewhat elongate; no pectoral appendages; ventral thoracic, united to the abdomen along its inner edge. Articulated fin-rays unbranched. Scales absent. Vertical fins more or less enveloped in skin.

Geographical Distribution. Seas of India to the Malay Archipelago and beyond.

823. (1.) **Polycaulis uranoscopus.** (Fig. 36.)

Synanceia uranoscopa, *Bl. Schn. Syst. Ich.* p. 195.
Polycaulis uranoscopus, *Day, Fish. India*, p. 164, pl. xxxix, fig. 6 (see synon.).

D. 9–12/11–14. P. 13. V. 1/5. A. 11–15. C. 11.

Length of head from $4\frac{1}{2}$ to 5, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Head covered with bony ridges having numerous blunt points. Lower jaw the longer. *Fins*—the low dorsal commences between or rather in advance of the

Fig. 36.—*Polycaulis uranoscopus.*

superior openings of the gills. Ventral attached along its entire inner edge to the abdomen. *Colour*—brownish, with or without white dots; fins stained dark at their edges, sometimes spotted, the caudal with a white edge.

Hab. Seas and estuaries of India, to the Malay Archipelago and beyond; attaining at least 5 inches in length.

Family VII. NANDIDÆ.

Pseudochromides, pt., et *Mænoidei*, pt., Müll. & Trosch.

Branchiostegals five or six; pseudobranchiæ present in marine genera, but sometimes concealed or absent in freshwater forms. Body oblong and compressed. Teeth feeble, but dentition more or less complete. Dorsal fin single; the base of the spinous portion longer than that of the soft or equal to it; anal with 3 spines, its soft portion similar to that of the dorsal; ventrals thoracic, 1/4 or 1/5. Scales ctenoid, covering the body. Lateral line interrupted or absent. No superbranchial organ. Air-bladder present. Pyloric appendages few or absent.

Geographical Distribution. Of the Asiatic genera of *Nandidæ*, some are marine, others freshwater; their range extends from the Red Sea and east coast of Africa to India, the Malay Archipelago and beyond.

Synopsis of Indian Genera.

First group. PLESIOPINA.

Pseudobranchiæ present; ventral with four rays.

The first one or two ventral rays elongate and bifid .. 1. PLESIOPS.

Second group. NANDINA.

Pseudobranchiæ absent; ventral with five rays.

Preopercle not serrated. Villiform teeth in jaws and palate, but not on tongue........................ 2. BADIS.
Preopercle serrated. Villiform teeth in jaws, palate, root of tongue, and cavity of mouth .... 3. NANDUS.
Preopercles serrated. Villiform teeth in jaws and palate, with globular crowns at root of tongue and roof of cavity of mouth .... 4. PRISTOLEPIS.

First group. PLESIOPINA.

1. Genus PLESIOPS, Cuv.

Syn. *Pharopteryx*, Rüpp.

Branchiostegals six; pseudobranchiæ. Body oblong and compressed. Mouth moderately protractile. None of the bones of the head serrated. Villiform teeth on the jaws, vomer, and palatines, none on the tongue. Eleven or twelve spines in the dorsal fin, three in the anal; ventral with one spine and four rays, the outer rays elongate and bifid. Lateral line interrupted. Air-bladder present. Pyloric appendages absent.

Geographical Distribution. Red Sea, seas of India and Malay Archipelago, and the Pacific.

824. (1.) Plesiops nigricans. (Fig. 37.)

Pharopteryx nigricans, *Rüpp. Atl.* p. 15, t. iv, fig. 2.
Plesiops nigricans, *Day, Fish. India,* p. 128, pl. xxxi, fig. 5 (see synon.).

D. 12/7–8. P. 21. A. 3/8. C. 16. L. l. 23–28. L. tr. $2\frac{1}{2}$/10.

Length of head from $3\frac{3}{4}$ to 4, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and 1 apart. *Teeth*—outer row in upper jaw usually slightly enlarged. *Fins*—dorsal spines much shorter than rays; interspinous membrane (which extends beyond tip of each spine) deeply emarginate; soft portion of fin and also of anal pointed; two outer ventral rays elongate; third anal spine longest; caudal pointed. *Scales*—finely ctenoid in last half of body. *Colour*

—brownish, each scale on the body with a blue centre, some of those on the shoulder and head with several blue spots. Opercle with a large black, blue-edged ocellus. A blue band along the dorsal and anal fins; dorsal, caudal, and anal with a white margin; soft

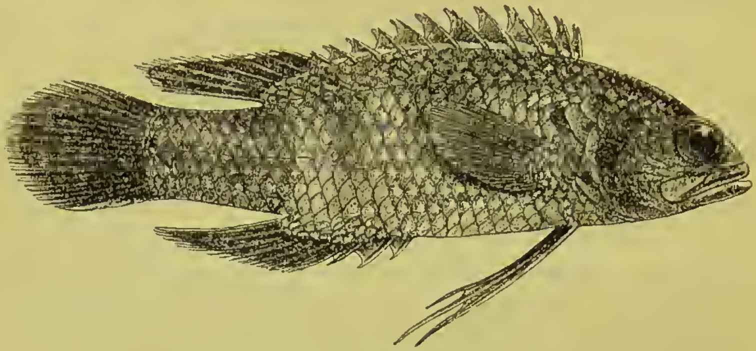

Fig. 37.—*Plesiops nigricans.*

dorsal and anal with blue streaks in the direction of the rays; streaks are also present on the caudal but in the form of transverse blotches.

Hab. From the Red Sea, through the seas of India to the Malay Archipelago and beyond. This fish is very common at the Andaman Islands, attaining at least 6 inches in length.

Second group. NANDINA.

2. Genus **BADIS**, Bleeker.

Branchiostegals six; pseudobranchiæ apparently absent. Mouth protractile. Opercle with one sharp spine; other bones of the head armed. Villiform teeth on the jaws, vomer, and palatines, absent from the tongue. A single dorsal fin, the spinous portion of much greater extent than the soft; anal with 3 spines, its rayed portion similar to that of the dorsal; ventral 1/5. Scales ctenoid, of moderate size. Lateral line interrupted or absent. Air-bladder large and simple. Pyloric appendages absent.

Geographical Distribution. Fresh waters of the hills and plains of India and Burma.

Synopsis of Indian Species.

Lateral line interrupted. Purplish, banded or spotted	1. *B. buchanani*, p. 80.
Lateral line absent. Stone-colour with vertical bands	2. *B. dario*, p. 82.

825. (1.) **Badis buchanani.** (Fig. 38.)

Labrus badis, *Ham. Buch. Fish. Ganges*, pp. 70, 368, pl. 25, fig. 23.
Badis buchanani, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng. Hind.* p. 106; *Day, Fish. India*, p. 128, pl. xxxi, fig. 6 (see synon.).

Kala-poo-ti-ah and *Chiri*, Punj.; *Kundala* and *Ka-sundara*, Tel.; *Kahlee-poce* and *Bundei*, Ooriah; *Nabat* and *Ran-doh-nee*, Assam.; *Pin-lay-nga-ba-mah* and *Nga-mee-loung*, Burm.

D. 16–18/7–10. P. 12. A. 3/6–8. C. 16. L. l. 26–33. L. tr. $2\frac{1}{2}$/8.

Length of head $4\frac{1}{2}$ to 5, height of body $2\frac{3}{4}$ to $4\frac{1}{2}$, in the variety figured, in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, $\frac{2}{3}$ from end of snout, and 1 apart. Form of body an elongated oval, sides compressed. *Teeth*—villiform in jaws, vomer, and palatines, also on pre-sphenoid and epi-hyal. *Fins*—dorsal spines somewhat slender, the soft portion of the fin rather elevated and pointed; anal spines short, caudal pointed. The number of spines

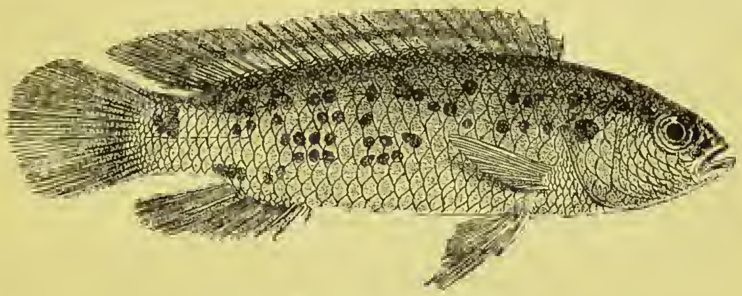

Fig. 38.—*Badis buchanani.*

and rays varies: in Bengal and Madras the formula is generally D. 16–17/8–7, A. 3/6–7, L. l. 26–28; but in Assam and Burma it is mostly D. 17–18/9–10, A. 3/8, L. l. 28–33. *Scales*—ctenoid, extending over the body and head, there are two or three small rows along the bases of the dorsal and anal fins, and some minute ones often present on the rays of the vertical fins, one entire row intervenes between highest portion of lateral line and the small scales along base of dorsal fin. *Lateral line*—interrupted below posterior extremity of dorsal. *Colour*—subject to great variation. In India proper, including the Punjab and Sind, the body is variegated with alternate belts of black and green; but in old fishes, especially if captured in dirty water, these bands are black and dirty red. On each shoulder there is usually a bluish-black spot, another is often present on the opercle, and a third at base of caudal. In Assam these fishes are dull red, blotched or spotted with black; but in Burma the spots take the form of six vertical bands, each formed by four transverse blotches one above the other; a large one is situated on the shoulder, and another on the side of the free portion of the tail; all the vertical fins have a narrow white edge.

Hab. Fresh waters of India and Burma, attaining at least $3\frac{1}{2}$ inches in length. I obtained several at Mandalay in Upper Burma from a canal which was being baled out.

826. (2.) **Badis dario.**

Labrus dario, *Ham. Buch. Fish. Ganges*, pp. 72, 368.
Badis dario, *Günther, Catal.* iii, p. 367; *Day, Fish. India*, p. 129 (see synon.).

Kankakie, Ooriah; *Ka-sondara*, Tel.

D. 14/8. P. 9. A. 3/7. C. 15. L. l. 26–30. L. tr. 11.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter 3 in length of head, ½ diam. from end of snout and also apart. *Teeth*—minute as in the last species. *Fins*—dorsal spines slender, the soft portion as well as that of the anal pointed; caudal wedge-shaped. *Scales*—rather large. *Lateral line*—absent. *Colour*—stone-colour, with several black vertical bands, mostly in the posterior half of the body; in dirty water the black colour extends all over.

Hab. Ponds, rivers, and ditches in the northern parts of Bengal, Behar, and along the Western Ghats; attaining 3 inches in length.

3. Genus **NANDUS**, Cuv. & Val.

Syn. *Bedula*, Gray.

Branchiostegals six; pseudobranchiæ absent. Body oblong, compressed. Mouth very protractile, its cleft deep. Opercle with one spine; preopercle serrated, or more or less entire, as are also the preorbital, sub- and interopercles. Teeth villiform on the jaws, vomer, palatines, and tongue. Ventrals 1/5. Spinous portion of dorsal fin longer than rayed part; anal with 3 spines. Scales of moderate size, ctenoid. Lateral line interrupted. Air-bladder large and simple. Pyloric appendages absent.

Geographical Distribution. Fresh waters of India, Burma, and Siam.

827. (1.) **Nandus marmoratus.** (Fig. 39.)

Coius nandus, *Ham. Buch. Fish. Ganges*, pp. 96, 370, pl. 30, fig. 32.
Nandus marmoratus, *Cuv. & Val.* vii, p. 482, pl. 207; *Day, Fish. India*, p. 129, pl. xxxii, fig. 1 (see synon.).

Mootahree, Mal.; *Bodosi* and *Gossiporah*, Ooriah; *Vaadhul*, Hind.; *Septi*, Tel.; *Latha* and *Gudtha*, Beng.; *Mussoassah*, Punj.; *Gad-gud-di* and *Bad-vaad-hi*, Assam.

D. 12–14/11–13. A. 3/7–9. L. l. 46–57. L. tr. 5½–6/17–20. Vert. 24.

Length of head 3, height of body 3 to 3⅓ in the total length. *Eyes*—diameter 5 to 6 in length of head, rather above 1 diam. from end of snout, and 1 apart. Premaxillaries very protrusible, reaching to one diameter behind the posterior border of the orbit. The posterior extremity of the maxilla reaches to some distance behind the eye. *Teeth*—in villiform bands in the jaws, in an elongate band, widest at either extremity, on the tongue; in a narrow row on the palatines and in a Λ-shaped band on the vomer, in

some cases "intermixed with these in each jaw are several sharp teeth of a larger size" (Ham. Buch. *l. c.*). *Fins*—dorsal spines rather strong, their base receivable into a groove, interspinous membrane deeply emarginate, soft portion of fin similar to that of anal and almost square; anal spines of moderate strength, the second longest and equal to two thirds length of rays; caudal cut nearly square. *Scales*—rather smaller on nape than on body, some extend over bases of dorsal and anal rays, an enlarged one at angle of ventral fin and another between the two ventrals. *Lateral line*—interrupted at about the 36th scale. *Colour*—greenish brown

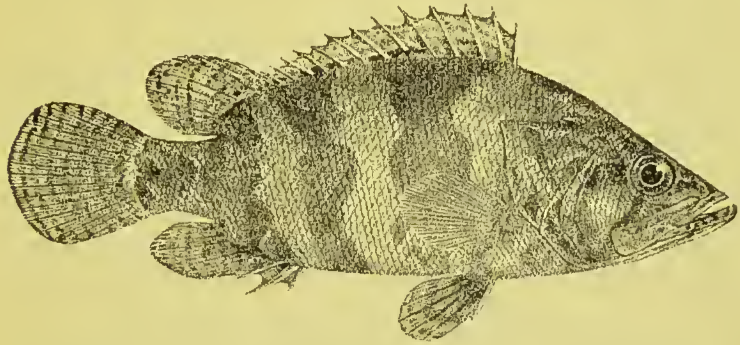

Fig. 39.—*Nandus marmoratus.*

with brassy reflections, vertically marbled with three broad patchy bands; a fourth crosses the free portion of the tail, or occasionally there exists a black blotch there; some narrow dark bands radiate from the eye. Narrow bands of spots across the soft portions of the dorsal, anal, and caudal fins.

In Assam and to the east of Bengal the bones of the head are more strongly serrated than is usually seen in the other parts of India.

Hab. Fresh and brackish waters of India and Burma, attaining at least 7 inches in length. This species is common in ditches and inundated fields, where it preys on small *Cyprinidæ.* It is exceedingly tenacious of life.

4. Genus **PRISTOLEPIS**, Jerdon (1848).

Syn. *Catopra*, Bleeker (1851); *Paranandus*, Day.

Branchiostegals six; pseudobranchiæ absent. Mouth moderately protractile. Opercle with two flat (generally bifid) spines; preopercle and preorbital mostly serrated. Teeth villiform on the jaws and palate, villiform or globular on the vomer, obtusely globular on the base of the tongue, on the roof of the cavity of the mouth (presphenoid), and sometimes on the vomer. Anal fin with 3 or 4 spines; ventrals 1/5. Scales ctenoid, large, extended on to

the interbrachial membrane. Lateral line interrupted. Pyloric appendages two.

Geographical Distribution. Fresh waters of the plains and hills of Malabar, Burma, Siam, and the Malay Archipelago.

Synopsis of Indian Species.

A. Teeth on vomer villiform (*Paranandus*).
a. Anal spines 4 .... 1. *P. marginata*, p. 84.
b. Anal spines 3 .... 2. *P. malabarica*, p. 84.
B. Teeth on vomer globular (*Catopra*); A. 3/8. 3. *P. fasciata*, p. 85.

828. (1.) Pristolepis marginata.

Pristolepis marginatus, *Jerdon, Mad. Journ. L. S.* xv, 1848, p. 141; *Day, Fish. India*, p. 130 (see synon.).

D. 15–16/11–12. P. 14. A. 4/8. L. r. 30/27. L. tr. $3\frac{1}{2}$–11.

Length of head $3\frac{1}{3}$ to $3\frac{3}{4}$, height of body $3\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{2}{3}$ in length of head, 1 diam. from end of snout, and $\frac{2}{3}$ apart. Lower jaw very slightly the longer. Preoperele serrated at its angle and also for a short distanee along its vertical border; sub- and interopercles likewise serrated; operele with two flat spines, the lower of which may be bifid; preorbital sometimes rather strongly serrated. *Teeth*—an outer row rather widely plaeed and eurved in each jaw. *Fins*—dorsal spines rather strong, inereasing in length to the 5th; 3 last anal spines about the same length; eaudal rounded. *Scales*—13 rows between the base of the ventral and that of the dorsal fin. *Lateral line*—interrupted opposite the last third of the soft dorsal on the twenty-first seale. *Colour*—as in the next species.

Hab. This form, originally deseribed by Jerdon, was obtained from the Manantoddy river flowing into the Cauvery; in the Cotiaddy river in North Malabar, and in the stream that runs near Canote in the same district. I obtained one specimen in Malabar $3\frac{3}{4}$ inches in length, with *P. malabarica.* This fish is said to attain a considerably greater length than 4 inches.

829. (2.) Pristolepis malabarica.

Catopra malabarica, *Günther, A. M. N. H.* ser. 3, xiv, 1864, p. 375.
Pristolepis malabaricus, *Day, Fish. India*, p. 131, pl. xxxii, fig. 2 (see synon.).

Chutichi, Mal.

D. 14/12–14. C. 16. L. r. 27–29/25–27. L. tr. $3\frac{1}{2}$/11. Vert. 13/11.

Length of head 4 to $4\frac{1}{2}$, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Body eompressed; jaws equal in front. Preopercle with its vertical limb roughened, in some eases serrated,

most strongly so at its angle; sub- and interopercles with some fine serrations at their approximating portions. Opercle with two sharp flat spines generally bifid; preorbital entire. *Teeth*—outer row in jaws somewhat enlarged, some specimens have merely two or four teeth enlarged in the lower jaw, and standing rather in front of the remainder; the presphenoid has small teeth, all but the outer row of which have rounded crowns, and there are some of the same description at the root of the tongue on the epi- and cerato-hyals; villiform teeth on both superior and inferior pharyngeals. *Fins*—dorsal spines rather stout, shorter than the rays, increasing in length to the 3rd and having a groove for their reception along their base, interspinous membrane somewhat deeply emarginate; second anal spine thickest but not quite so long as the third, a groove along their base; caudal rounded. *Lateral line*—interrupted, ceasing opposite the fourth ray on the twenty-first scale, commencing again in the centre of the side below the last ray, 13 rows between ventral and base of dorsal. *Colour*—rifle-green with purplish reflections, fins with lighter edges; caudal with a white outer margin. In some specimens the fish is vertically banded.

Hab. Ghats of Western India, where this fish seems to prefer clear and rapid streams, and to attain at least to 6 inches in length.

830. (3.) Pristolepis fasciata. (Fig. 40.)

Catopra fasciata, *Bleeker, Batavia Nat. Tijdsch.* ii, p. 65.
Pristolepis fasciatus, *Day, Fish. India,* p. 131, pl. xxxii, fig. 3 (see synon.).

D. 12–13/14–16. A. 3/8. C. 14. L. r. 30/28. L. tr. $4\frac{1}{2}$/12. Cæc. pyl. 2.

Length of head from $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter nearly 4 in length of head, 1 diam.

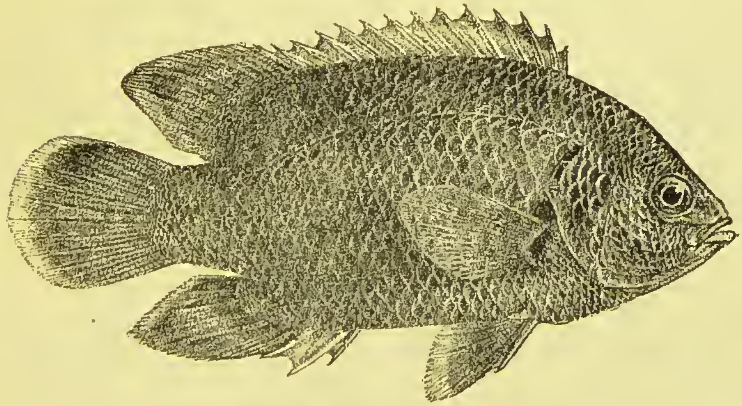

Fig. 40.—*Pristolepis fasciata.*

from end of snout, and $1\frac{1}{2}$ apart. Body oblong, compressed. Preorbital and preopercle rather strongly serrated; fine serrations,

which may be absent, on the contiguous portions of the sub- and interopercles; two sharp flat spines on the opercle, mostly bifid and the lower the larger. *Teeth*—globular on vomer, base of tongue, and roof of the cavity of the mouth, at the base of the tongue they extend forward nearly to its anterior extremity. In the young (*C. siamensis*), the vomerine teeth are not quite so blunted as they become in the adult. *Fins*—dorsal spines strong, interspinous membrane deeply emarginate, rays in the middle the longest; second anal spine strongest but not so long as third; caudal rounded. *Lateral line*—interrupted opposite posterior end of dorsal fin, being continued on the third row of scales below it. *Air-bladder*—large. *Scales*—16 or 17 rows between bases of the ventral and dorsal. *Colour*—dull greenish, a deep black spot in the axilla and over upper part of base of pectoral, which is yellow; the other fins slate-coloured.

Hab. Fresh waters of Burma, Siam, and the Malay Archipelago. Four specimens were procured in Burma varying from $4\frac{3}{10}$ to 8 inches in length.

Family VIII. MALACANTHIDÆ.

Branchiostegals from five to six; pseudobranchiæ present. Gill-openings wide, the membranes united beneath the throat; gills four, with a slit behind the fourth. Body elongate and compressed; lips thick. A posterior canine tooth in the premaxillary. Dorsal and anal fins with many rays, the first few of the former not being articulated. Ventrals thoracic, with one spine and five rays. Scales small and finely ctenoid. Air-bladder simple. Pyloric appendages absent.

1. Genus **MALACANTHUS**, Cuv.

Cleft of mouth horizontal, the jaws equal anteriorly. Opercle with a spine, preopercle entire. Eyes lateral. Villiform teeth in the jaws, having an outer band of stronger ones; palate toothless. A long and continuous dorsal fin, with the first four to six rays unarticulated.

Geographical Distribution. Tropical seas.

831. (1.) **Malacanthus latovittatus.** (Fig. 41.)

Labrus lato-vittatus, *Lacép. H. N. Poiss.* iii, p. 526, pl. xxviii, fig. 2.
Malacanthus lato-vittatus, *Day, Fish. India, Suppl.* 1888, p. 787 (see synon.).

B. iv–v. D. 4/43–46. P. 17. A. 1/38–40. C. 17. L. l. 125.

Length of head 4, of caudal fin 9, height of body 6 to 7 in the total length. *Eyes*—high up, and situated nearly midway between the end of the snout and the posterior extremity of the opercle;

diameter 7 in length of head. Cleft of mouth does not extend to below front edge of orbit. *Fins*—dorsal commences above axial of pectoral, but does not extend on to the caudal. *Colour*—brownish with a broad black band along the side from the pectoral to the caudal fin.

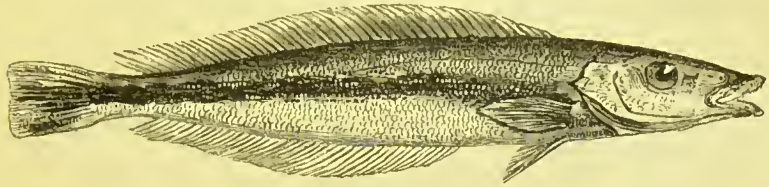

Fig. 41.—*Malacanthus lativittatus.*

Hab. New Guinea, Mauritius, Ceylon (*Haly*).

Family IX. TEUTHIDIDÆ.

Teuthyes, pt., Cuv.

Branchiostegals five; pseudobranchiæ well developed. Body oval and strongly compressed. Eyes of moderate size, lateral. Mouth slightly cleft, and but little protractile. A single row of cutting incisors in either jaw; palate edentulous. One dorsal fin with the spinous portion more developed than the soft; anal with seven spines. Ventrals thoracic, each with two spines and three intermediate soft rays. Scales minute. Lateral line complete.

1. Genus **TEUTHIS**, Linn.

Syn. *Siganus*, Forsk.; *Centrogaster*, Houtt.; *Amphacanthus*, Bl. Schn.; *Buro* (Comm.) Lacép.

Worah, Tam.; *Nga-pron-ka*, Mugh.

Teeth small. A single dorsal fin with thirteen spines and a horizontal one in front. Scales cycloid. Air-bladder large, forked both anteriorly and posteriorly. Pyloric appendages when present few (4–6) *.

Geographical Distribution. Red Sea, Indian and Pacific Oceans.

Synopsis of Indian Species.

Pale round spots on back, becoming elongate and passing into bands on abdomen ..	1. *T. java*, p. 88.
Sinuous vermiculate blue lines on body throughout; height $2\frac{1}{2}$ in total	2. *T. vermiculata*, p. 88.
Sinuous blue lines on back, becoming longitudinal below; height $3\frac{1}{2}$ in total	3. *T. marmorata*, p. 89.
Blue spots on back, 2 oblique brown bands on head and shoulder	4. *T. virgata*, p. 89.

* Rüppell states that in *T. sigana* they are absent.

Blue bands on head, orange spots on body. 5. *T. concatenata*, p. 90.
Small subdistant blue spots; no bands.
Height of body $3\frac{1}{2}$ in total .... 6. *T. margaritifera*, p. 90.
Height $2\frac{3}{4}$ in total .... 7. *T. sutor*, p. 90.
Indistinct white spots on body, caudal barred .... 8. *T. oramin*, p. 91.
Greyish with purplish angular spots ...... 9. *T. stellata*, p. 92.

832. (1.) Teuthis java.

Teuthis java, *Linn. Syst. Nat.* i, p. 507; *Day, Fish. India*, p. 165, pl. xxxix, fig. 5 (see synon.).

Ottah, Tam.; *Thar-oar-dah*, Andam.; *Worahwah*, Tel.; *Nya-ryn-sha*, Arracan.

D. 13/10. P. 18. V. 1/3/1. A. 7/9. C. 19.

Length of head $5\frac{1}{4}$, height of body $2\frac{2}{3}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Interorbital space rather elevated, with a central shallow groove which narrows anteriorly; anterior upper edge of orbit serrated. *Fins*—dorsal spines strong, increasing in length to the 4th, which is slightly higher than the rays, from it they decrease to the last; soft portion of fin (and of anal) obliquely rounded; anal spines strong, increasing in length to 3rd, which equals longest in dorsal fin, then decreasing to 6th, but the 7th is longer and equal to 3rd; caudal emarginate. *Colour*—head, back, and sides dark brownish neutral tint, abdomen lighter. On the head and back many pale grey rounded spots, becoming more elongate on sides and abdomen. Diameter of upper spots less than their distance apart. No streaks on the head as a rule, but in some instances the cheeks are reticulated; fins immaculate.

Hab. Seas of India to the Malay Archipelago and beyond.

833. (2.) Teuthis vermiculata.

Amphacanthus vermiculatus (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* x. p. 126.
Teuthis vermiculata, *Günther, Catal.* iii, p. 317; *Day, Fish. India*, p. 166, pl. xl, fig. 1 (see synon.).

Kut-e-rah, Mal.; *Chow-lud-dah*, Andam.

D. 13/9–10. P. 16. V. 1/3/1. A. 7/8–9. C. 17.

Length of head about 5, height of body $2\frac{1}{3}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, upwards of $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{3}$ apart. *Fins*—dorsal spines strong, from the fourth they are about equal, but not so high as first few rays; rayed portion of fin angular; anal of same form as dorsal, but spines stronger and of about the same height from the third; caudal slightly emarginate. *Scales*—distinct over the body and cheeks. *Colour*—light brown, running into bluish green on back, and nearly white on abdomen. The whole of the body, head, and

lips are vermiculated with very sinuous bluish lines of about one fourth the width of the interspaces, being broadest near the abdomen; caudal fin with brown lines.

Hab. Seas of India, Malay Archipelago and beyond, attaining at least 11 inches in length.

834. (3.) Teuthis marmorata.

Amphacanthus marmoratus, *Quoy & Gaim. Voy. Uranie et Phys. Zool.* p. 367, pl. 62, figs. 1, 2.
Teuthis marmorata, *Günther, Catal.* iii, p. 322; *Day, Fish. India,* p. 166, pl. xl, fig. 2 (see synon.).

B. v. D. 13/10. P. 18. V. 1/3/1. A. 7/9. C. 17.

Length of head 5 to $5\frac{1}{3}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Interorbital space nearly flat, edge of orbit entire. *Fins*—dorsal spines increasing to the fourth and subsequently decreasing from the seventh, the highest spines half as long again as the soft portion of the fin, which is rounded; anal spines increase in length to the third, from which they decrease to the last; caudal lobed, upper lobe the longer. *Colour*—brownish, covered all over the back with blue vermiculated lines, which become sinuously-longitudinal along the sides; head covered with similar lines. Dorsal, anal, and caudal with sinuous brown lines; pectorals yellow.

Hab. Seas of India to the Malay Archipelago.

835. (4.) Teuthis virgata.

Amphacanthus virgatus, *Cuv. & Val. H. N. Poiss.* x, p. 133.
Teuthis virgata, *Day, Fish. India,* p. 166, pl. xl, fig. 3 (see synon.).

Tah-meer-dah, Andam.

D. 13/10. P. 17. V. 1/3/1. A. 7/9. C. 17. Cæc. pyl. 4.

Length of head $4\frac{1}{2}$, height of body $2\frac{1}{2}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $1\frac{1}{4}$ apart. A slight protuberance over the eyes; no serrations to orbit. *Fins*—dorsal spines increasing in length to 5th and remaining about same height to 7th, after which they decrease; the longest spines equal head excluding snout, and are of same height as longest rays, soft portion rather angular; anal spines increase in length to 4th, from which they continue of about the same length, or equal to the longest in the dorsal fin; caudal emarginate. *Colour*—some oblique blue lines and spots on the snout. Upper two thirds of body coppery yellow, covered with round blue spots; blue lines on the head. A brown band, as wide as orbit, from before the dorsal fin through the eye to below the jaws; a second from the sixth and seventh dorsal spines to the base of the pectoral; both these bands with undulating blue edges. Fins yellowish.

Hab. Andamans to the Malay Archipelago, and beyond.

836. (5.) Teuthis concatenata.

Amphacanthus concatenatus, *Cuv. & Val. H. N. Poiss.* x, p. 127.
Teuthis concatenata, *Cantor, J. A. S. B.* xviii, p. 1190; *Day, Fish. India*, p. 167, pl. xl, fig. 4 (see synon.).

Thar-oar-dah, Andam.

D. 13/10. P. 18. V. 1/3/1. A. 7/9. C. 18. Cæc. pyl. 5–6. Vert. 10/13.

Length of head $4\frac{3}{4}$, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Interorbital space with a broad shallow groove along its whole extent, bounded on either side by a low ridge; anterior upper angle of orbit freely serrated. *Fins*—dorsal spines increase in length to 5th, and then slightly decrease to 12th, but the last is a little longer; soft portion of dorsal and anal fins angular and rather higher than longest spine; ventral reaches anal; anal spines increase in length to 3rd, which equals highest dorsal, last spine a little longer; caudal emarginate. *Scales*—larger than in most of the known species. *Colour*—dark greyish brown, covered all over with light orange spots, which along the back are larger than the interspaces, but decrease in size towards the abdomen. A broad blue band extends from below the orbit to the angle of the mouth, and another passes along the preopercle; brown spots on the caudal fin.

Hab. Andaman Islands and Malay Archipelago.

837. (6.) Teuthis margaritifera.

Amphacanthus margaritiferus, *Cuv. & Val. H. N. Poiss.* x, p. 145.
Teuthis margaritifera, *Günther, Catal.* iii, p. 317; *Day, Fish. India*, p. 167, pl. xl, fig. 5 (see synon.).

D. 13/10. P. 17. V. 1/3/1. A. 7/9. C. 17. Vert. 10/13.

Length of head $5\frac{1}{4}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Dorsal and abdominal profiles equally convex. Interorbital space nearly flat; no serrations along the edge of orbit. *Fins*—dorsal spines rather weak, increasing in length to 5th, which is one third longer than the rays, subsequently decreasing to last; pectoral rather pointed; ventral does not reach anal; 3rd and 4th anal spines slightly longer than 2nd and equal to 3rd dorsal, from 4th the spines decrease to the last; caudal lobed, the upper lobe longer, central. *Colour*—brownish olive, with small scattered blue spots much smaller than the interspaces on the back and sides; a dark oval shoulder-mark; some dark lines on the spinous dorsal; soft dorsal and anal with brown spots.

Hab. Andamans to the Malay Archipelago and beyond.

838. (7.) Teuthis sutor.

Amphacanthus sutor, *Cuv. & Val. H. N. Poiss.* x, p. 148.
Teuthis sutor, *Günther, Catal.* iii, p. 317; *Day, Fish. India*, p. 167 (see synon.).

D. 13(14)/10. P. 16. V. 1/3/1. A. 7/9 (10). C. 17.

Length of head $5\frac{1}{2}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Anterior upper edge of orbit indistinctly serrated. *Fins*—fifth dorsal spine the longest, from it they decrease to the last, which equals $1\frac{1}{4}$ diameters of the orbit in length; third anal spine the longest, equal to 5th dorsal, from it they decrease to the last, which is only two fifths of the same; caudal emarginate, the central rays $\frac{4}{9}$ of length of outer. *Colour*—light brown, with pale blue spots, those in the middle of the side being the largest and having brown centres; a dark blotch on the shoulder.

Hab. Seychelles and coast of Malabar.

839. (8.) **Teuthis oramin.** (Fig. 42.)

Amphacanthus guttatus, var. oramin, *Bl. Schn. Syst. Ich.* p. 207, t. 48.
Teuthis oramin, *Günther, Catal.* iii, p. 318; *Day, Fish. India,* p. 168, pl. xl, fig. 6 (see synon.).

Dhagavir, Marát.; *Tafeza,* Arabi.

D. 13/10. P. 16. V. 1/3/1. A. 7/9. C. 17.

Length of head from $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in the length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Interorbital space flat, anterior upper edge of orbit very finely serrated. *Fins*—dorsal spines rather weak, increasing in length to 4th, which is nearly twice as long as the rays, subsequently they decrease to the last;

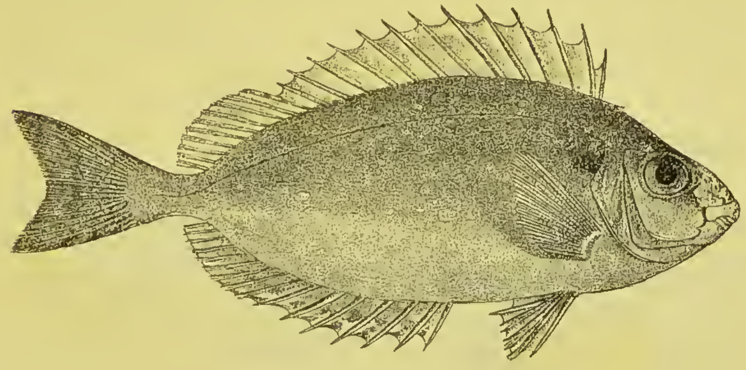

Fig. 42.—*Teuthis oramin.*

anal spines increase to the 3rd and 4th, which equal highest dorsal, they subsequently decrease to the last; caudal with pointed lobes, central rays two thirds length of outer. *Colour*—olivaceous, with indistinct longitudinal stripes in upper half of body, below silvery white. A round black shoulder-spot, and a

black spot at top of eye; numerous pearl-white spots on upper half of body. Dorsal fin spotted with brown; caudal with four or five vertical bars and a black outer edge. Spinous portion of anal with large black spots, the soft irregularly lineated; pectorals orange. In specimens over 7 or 8 inches in length the markings on the fins generally become obsolete, the white spots on the body decrease in number and have a blue tinge. The shoulder-spot becomes dark, but the spot on the upper edge of the eye remains.

Hab. Common along the coasts of India, attaining at least 9 inches in length.

840. (9.) Teuthis stellata.

Scarus stellatus, *Forsk. Descr. Anim.* p. 26, no. 10.
Teuthis stellata, *Günther, Catal.* iii, p. 320; *Day, Fish. India*, p. 168 (see synon.).

D. 13/10. P. 16. V. 1/3/1. A. 7/9. C. 19.

Length of head nearly 4, height of body about 3 in total length. *Eyes*—diameter 3 in length of head, $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—fourth dorsal spine the highest, soft dorsal and anal rather pointed; last anal spine the longest; caudal deeply lobed, the upper the longer. *Colour*—greyish, covered all over with small angular spots of a purplish-brown colour; a greenish-yellow spot in front of dorsal fin; a dark shoulder-spot sometimes present; dorsal and anal fins spotted with brown, border of soft rays and of caudal yellowish.

Hab. Red Sea, through those of India.

Family X. BERYCIDÆ.

Holocentrinæ, pt., Swainson.

Branchiostegals from four to eight; pseudobranchiæ present. Form of body oblong, or rather elevated and compressed. Opercles more or less armed. Head with large muciferous cavities. Eyes large, lateral. Cleft of mouth more or less oblique, extending to the sides of the muzzle. Teeth more or less villiform in both jaws, and usually so on the palate. Ventrals thoracic; each with either more or less than five soft rays. Scales ctenoid, seldom bony or absent; none on the head.

Geographical Distribution. Wide, many of the forms living at great depths.

Synopsis of Indian Genera.

No large spine at angle of preoperele .... 1. Myripristis.
A long, strong spine at angle of preopercle .... 2. Holocentrum.

1. Genus MYRIPRISTIS, Cuv.

Branchiostegals usually 8, more rarely 7; pseudobranchiæ well developed. Muzzle short, lower jaw prominent. Cleft of mouth oblique, in one species horizontal. Opercular pieces serrated; opercle generally with one spine, none on the preopercle. Teeth villiform on jaws, vomer, and palatines; there may be an outer widely separated row of small, obtusely conical ones in the jaws. Two dorsal fins, scarcely united; ventral with one spine and 7 rays; anal with four spines; caudal forked. Scales large, ctenoid. Air-bladder transversely contracted near its middle. Pyloric appendages in moderate numbers.

Geographical Distribution. Tropical seas.

Synopsis of Indian Species.

Scarlet, vertical fins with black tips; eyes ¾ diam. apart .... 1. *M. botche,* p. 93.
Roseate, vertical fins with white edges; eyes ½ diam. apart .... 2. *M. murdjan,* p. 94.

841. (1.) Myripristis botche. (Fig. 43.)

Botche, *Russell, Fish. Vizag.* ii, p. 4, pl. cv.
Myripristis botche, *Cuv. & Val. H. N. Poiss.* iii, p. 181; *Day, Fish. India,* p. 169, pl. xli, fig. 1, *Suppl.* p. 788 (see synon.).

Moonda kun kakasi, Tam.

B. viii. D. 10 | 1/14–16. A. 4/12–13. L. l. 28–30. L. tr. 3/7½.

Length of head 3¾, height of body more than 3 in the total length. *Eyes*—diameter 2½ to 2¾ in length of head, ½ diam. from end of snout, and ¾ apart. Under surface of lower jaw roughly and

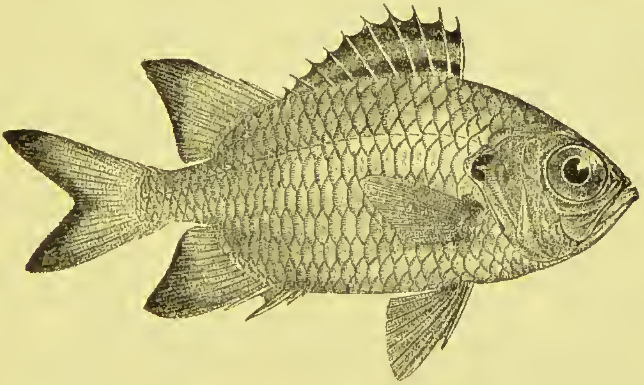

Fig. 43.—*Myripristis botche.*

irregularly furrowed; pre- and suborbitals serrated, also both limbs of preopercle; a moderately strong opercular spine with two or three others above and below it; the lower half of the opercle,

the sub- and the interopercles serrated. *Fins*—dorsal spines weak; second dorsal higher than the first; fourth anal spine the longest, but not so strong as the third. *Colour*—scarlet, edges of scales violet, more especially above lateral line; longitudinal bands, alternately lighter and darker along each row of scales. First dorsal black, or black with a light longitudinal band, or simply rose-coloured; the other fins pinkish, with the outer third of the soft dorsal, anal, and caudal lobes black, the black area sometimes reduced to a mere spot. A deep black spot behind the gill-opening, a dark mark in the axilla. In some rare instances a dark spot may exist on the upper edge of the eye.

Hab. East coast of Africa, seas of India, to the Malay Archipelago and beyond. Not nearly so common as *M. murdjan.*

842. (2.) Myripristis murdjan.

Sciæna murdjan, *Forsk. Descr. Anim.* p. 48, no. 52.
Myripristis murdjan, *Day, Fish. India,* p. 170, pl. xli, fig. 2.

B. viii. D. 10 | 1/14–15. A. 4/12–13. L. l. 28–30. L. tr. $3\frac{1}{2}/7\frac{1}{2}$.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body from 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{4}$ to $2\frac{1}{2}$ in length of head, $\frac{1}{3}$ diam. from end of snout, and about $\frac{1}{2}$ apart. Lower jaw slightly the longer, having a rough, nipple-like projection on either side of the symphysis. Under surface of lower jaw furrowed by ten or twelve grooves; the maxilla, pre-, sub-, and interopercles also grooved. Preopercle serrated in its whole extent. Interopercle finely denticulated; opercle with a moderately strong spine, having a few denticulations above it, and the whole of its outer margin below it serrated. Subopercle and shoulder-scale serrated. Upper surface of the head roughened by three or four raised lines, which, passing backwards, divide and subdivide, each terminating in a small spine. *Teeth*—villiform in the jaws, with an external row, widely separated, larger and conically rounded, 3 on either side slightly the largest, and rounded at their extremities, none on the tongue. *Fins*—dorsal spines increasing in length to third, which is about equal to three next, interspinous membrane rather deeply emarginate, front portion of second dorsal higher than first. Third anal spine the strongest, but the fourth the longest. *Colour*—roseate, gill-openings deep brownish black, or else like coagulated blood, a dark mark in the axilla. A dark vertical band through the eye, sometimes confined to above the pupil. Dorsal, caudal, and anal fins with milk-white outer edges; a dark mark, often deep black, may be present or absent at the highest points of the soft dorsal and anal fins, also at the tips of the caudal. Rarely there is a dark mark along the first dorsal. Outer edge of ventral white.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond. My longest specimen measures $11\frac{1}{4}$ inches. Very common at Madras, especially about February.

2. Genus HOLOCENTRUM, Artedi.

Syn. *Rhynchichthys*, Cuv. & Val. (young); *Corniger*, Agassiz.

Branchiostegals eight. Eyes large, lateral. Opercles and sub-orbitals serrated; opercle with two spines; generally a large spine at the angle of the preopercle. Villiform teeth on the jaws, vomer, and palatines. Two dorsal fins scarcely united; ventral with one spine and 7 rays; anal with 4 spines, the third being long and strong; caudal forked. Scales ctenoid, of moderate size. Air-bladder oval and simple. Pyloric appendages numerous.

Synopsis of Indian Species.

D. 11 | 1/13. No rostral spine .... 1. *H. diadema*, p. 95.
D. 11 | 15. A bifid rostral spine ...... 2. *H. andamanense*, p. 95.
D. 11 | 13–14. Both intranasal and rostral spines .... 3. *H. caudimaculatum*, p. 96.
D. 11 | 12–13. Two rostral, no internasal spines .... 4. *H. rubrum*, p. 96.
D. 10 | 1/11–12. No rostral spine? .... 5. *H. sammara*, p. 97.

843. (1.) Holocentrum diadema.

Holocentrum diadema, *Lacép. H. N. Poiss.* iv, pp. 372, 374, pl. 32, fig. 3; *Day, Fish. India*, p. 171 (see synon.).

Kyouk byoo, Arracan.

D. 11 | 1/13. P. 13. A. 4/9. C. 19. L. l. 47–48. L. tr. 3/7. Vert. 11/16.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to $3\frac{3}{5}$ in the total length. *Eyes*—diameter 2 to $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and from $\frac{1}{2}$ to $\frac{2}{3}$ apart, width of interorbital space being about $\frac{1}{4}$ of length of head. Lower edge of preorbital serrated and having a strong blunt spiny projection, directed downwards and forwards. Upper opercular spine the longest and strongest, but not equalling that on the preopercle. No spines at nostrils nor end of snout. *Fins*—the fourth to the sixth dorsal spines the longest, interspinous membrane deeply cleft; the two dorsal fins of about the same height. Ventral reaches the vent. *Colour*—red, with from 8 to 11 longitudinal silvery bands; spinous dorsal brownish black, having a white longitudinal band, the other fins rosy.

Hab. Red Sea, east coast of Africa, seas of India, the Malay Archipelago, China, and beyond.

844. (2.) Holocentrum andamanense.

Holocentrum andamanense, *Day, P. Z. S.* 1870, p. 686; *and Fish. India*, p. 172, pl. xli, fig. 3.

D. 11 | 15. P. 17. V. 1/7. A. 4/9. C. 22. L. l. 42. L. tr. $3\frac{1}{2}/7\frac{1}{2}$.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, 1 diam from

end of snout, and $\frac{3}{4}$ apart, width of interorbital space not quite $\frac{1}{5}$ of length of head. Vertical and horizontal margins of preopercle rather finely denticulated, and with an entire but fluted spine at the angle as long as the orbit or $\frac{1}{2}$ longer. Opercle with two or three flat spines, the upper or central one the longest, the margin of the opercle below it spiny; preorbital with two or three triangular tooth-like processes directed downwards along its lower border, and the interspace serrated. Shoulder-bone rather strongly serrated. A bifid spine on either side at end of snout. *Fins*—third to fifth dorsal spines the highest, the last spine much the shortest, interspinous membrane very slightly notched. *Scales*—seven or eight rows along the preopercle. *Colour*—uniform rosy scarlet.

Hab. Andamans, whence two specimens were procured, the longest measuring 9 inches.

845. (3.) Holocentrum caudimaculatum.

Holocentrus caudimaculatus, *Rüpp. Atlas*, pl. 23, fig. 1, *N. W., Fische*, p. 97.
Holocentrum caudimaculatum, *Day, Fish. India*, p. 172 (see synon.).

D. 11 | 13–14. P. 14. A. 4/9. C. 19. L. l. 40–43. L. tr. $3\frac{1}{2}/7\frac{1}{2}$.

Length of head $3\frac{1}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in length of head, from $\frac{1}{2}$ to $\frac{2}{3}$ diam. apart and also from end of snout, width of interorbital space about $\frac{1}{5}$ length of head. Preorbital serrated and anteriorly with a rather large blunt spine pointing downwards. Opercular bones serrated, the upper opercular spine the longer; the preopercular spine as long as or longer than the orbit. Shoulder-bone serrated. Two intranasal spines. *Fins*—fourth dorsal spine the longest, but not so high as the soft dorsal; dorsal interspinous membrane rather deeply emarginate. Third anal spine longest and strongest. *Colour*—red, more or less longitudinally banded with violet, and having a white spot over the free portion of the tail behind the end of the dorsal fin.

Hab. Red Sea, seas of India to the Malay Archipelago.

846. (4.) Holocentrum rubrum. (Fig. 44.)

Sciæna rubra, *Forsk. Descr. Anim.* p. 48, no. 51.
Holocentrum rubrum, *Günther, Catal.* i, p. 35; *Day, Fish. India*, p. 172, pl. xli, fig. 4 (see synon.).

Chirya, Marâthi; *Cul-kah-eatchee*, Tam.; *Kyouk-nga-nee*, Arracan.

D. 11 | 12–13. A. 4/9. L. l. 35–39. L. tr. $3/6\frac{1}{2}$. Cæc. pyl. 20. Vert. 11/16.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ to $3\frac{1}{2}$ in length of head, $\frac{2}{3}$ diam. from end of snout, $\frac{3}{4}$ apart, width of interorbital space from $\frac{2}{7}$ to $\frac{1}{4}$ length of head. Upper surface of the head roughened, with sinuous

lines which posteriorly end in spiny points. Suborbital ring of bones narrow, fluted and serrated in their whole extent. Preopercle likewise fluted along its vertical limb, having a strong spine as long as the orbit at its angle and serrated along both margins. Opercle evenly fluted, armed with two spines (the lower the shorter) and its outer edge strongly serrated; sub- and interopercles fluted and denticulated; shoulder-bones denticulated. Snout with two

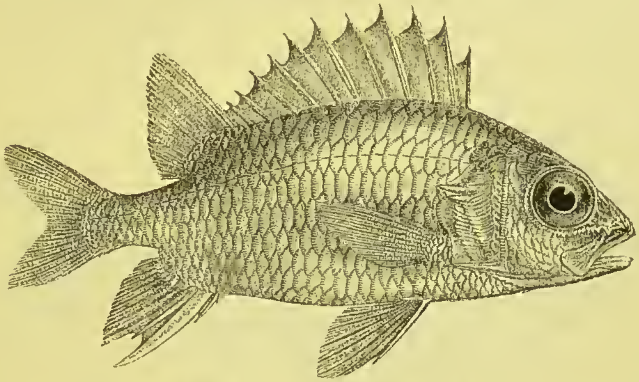

Fig. 44.—*Holocentrum rubrum.*

sharp nipple-shaped spines on the preorbital and intermediate serrations; no spines at nostrils. *Fins*—dorsal spines strong, 3rd to 5th longest, but not so high as soft portion of fin; third anal spine very strong. *Colour*—in the *young* silvery white, with longitudinal dull rosy bands from the opercles, the second and third coalescing. In the *adult* red, with seven or eight silvery bands. Head more or less rosy, as are also the fins. Occasionally there is a little dark colour about the latter.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

847. (5.) Holocentrum sammara.

Sciæna sammara, *Forsk. Descr. Anim.* p. 48, no. 53.
Holocentrum sammara, *Cuv. & Val. H. N. Poiss.* iii, p. 216; *Day Fish. India*, p. 173, *Suppl.* p. 788 (see synon.).

D.10 | 1/11–12. P.14. A.4/7–8. L.l.39–40. L.tr.3/7. Vert.11/16.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $2\frac{2}{3}$ to 3 in length of head, $\frac{2}{3}$ diam. from end of snout and also apart; the interorbital space $\frac{3}{10}$ to $\frac{1}{4}$ of length of head. The lower jaw the longer. Both limbs of preopercle serrated in their entire extent; length of preopercular spine about $\frac{1}{3}$ of diameter of orbit. The external edges of all the opercles more or less serrated; two spines on the opercle, the upper of which is as large as the preopercular one, the lower rather smaller. Preorbital denticulations strong; suborbital likewise

serrated. No spine at nostrils nor at end of the snout. Shoulder-bone striated and serrated. *Fins*—2nd, 3rd, and 4th dorsal spines about same height, subsequently the spines decrease to the 10th, which is one fourth as high; interspinous membrane deeply emarginate; second dorsal fin highest anteriorly and rather higher than the highest dorsal spine. Ventral reaches halfway to the anal. *Colour*—body with or without longitudinal violet bands, which may be composed of spots. A black spot may be present on either cheek. Usually a black spot on each space between the first four dorsal spines, and sometimes a light mark between the bases of each spine. Anterior edge of soft dorsal and anal, also usually upper and lower edge of caudal, violet.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

Family XI. KURTIDÆ.

Branchiostegals seven; pseudobranchiæ absent. Body oblong and compressed. Eyes large. Cleft of mouth oblique; lower jaw prominent. A single dorsal fin, the spinous portion of less extent than the soft; anal elongate, with two or three spines; ventrals thoracic, with one spine and five rays. Scales of moderate or small size. Air-bladder present. Pyloric appendages few.

Synopsis of Indian Genera.

Dorsal spines rudimentary, three anal ones. A horizontally directed spine between the ventral fins .... 1. KURTUS.

Six dorsal and three anal spines. Scales over the anal fin .... 2. PEMPHERIS.

1. Genus **KURTUS**, Bloch.

Body strongly compressed; back elevated. Preopercle denticulated. Villiform teeth in the jaws, vomer, and palatines. A single dorsal fin, much shorter than the anal, dorsal spines rudimentary; between the ventrals is a horizontal backwardly directed spine. Scales very small. Air-bladder present, enclosed in a conical cavity made by the ribs, which are dilated and convex, and form rings in contact with each other.

848. (1.) **Kurtus indicus.** (Fig. 45.)

Kurtus indicus, *Bloch, Ich.* t. 169; *Day, Fish. India,* p. 174, pl. xlii, fig. 1 (see synon.).

Kakasi and *Somdrum-kara-mooddee,* Tel.; *Ocrdah* and *Valliaul-cutchul,* Tam.

D. 6–7/13–14. P. 21. A. 2/31–33. C. 17. Vert. 8/15.

Length of head 4 to 4½, height of body 3 to 3½ in the total length.

Eyes—in anterior half of the head, 1 diameter from end of snout, and $1\frac{1}{4}$ apart. Males with a cartilaginous arched process directed forwards, and situated a short distance in front of the dorsal fin. Lower jaw having a tuberosity at the symphysis: when the mouth is closed the extremity of the mandible forms a portion of the dorsal profile. A strong, short spine directed downwards at angle of preoperele, and two or three more along its lower edge; the oecipital ridge rough. *Fins*—dorsal fin having five spines in front of the soft portion, preceded by a recumbent spine direeted anteriorly; in

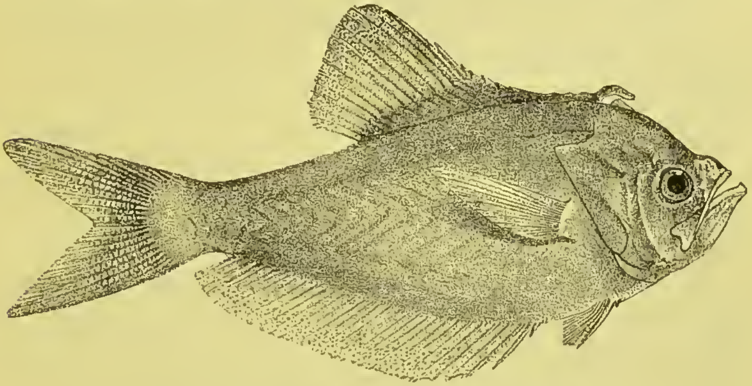

Fig. 45.—*Kurtus indicus* (male).

front of this spine are some points appearing above the skin, most distinct in the fry, and similar to the rudimentary fins of *Stromateidæ*, &c.; soft portion of the dorsal fin highest anteriorly; ventral reaches as far as the anal, it has a short backwardly directed spine in front of the base of the outer ray of either fin, and also a similar horizontal but larger one between the two fins; second anal spine two thirds as high as the rays; caudal deeply lobed. *Scales*—fine and irregular on the body. *Lateral line*—ceases opposite end of soft dorsal. *Colour*—silvery shot with steel-blue or lilac; baek with fine black dots which behind the occiput form a rounded black spot.

Hab. Seas of India to the Malay Archipelago and beyond. This fish attains at least $4\frac{1}{2}$ inches in length, and is most numerous on the Coromandel coast during the cold months.

2. Genus **PEMPHERIS**, Cuv. & Val.

Head obtuse. Opercle with a small spine. Villiform teeth on the jaws, vomer, and palatine bones. A single short dorsal fin with 6 spines and 9 rays; anal with 3 spines and many rays. Scales small, extended over the anal fin. Air-bladder divided into an anterior and posterior portion. Pyloric appendages few.

Geographical Distribution. Indian and Pacifie Oceans within the tropics.

Synopsis of Indian Species.

Eyes about $\frac{2}{5}$ length of head; height of body $\frac{3}{10}$ of total length . . . . 1. *P. malabarica*, p. 100.
Eyes large, $\frac{1}{2}$ length of head; height of body $\frac{2}{5}$ of total . . . . 2. *P. russellii*, p. 100.

849. (1.) **Pempheris malabarica.**

Pempheris malabarica, *Cuv. & Val. H. N. Poiss.* vii, p. 308; *Day, Fish. India, Suppl.* p. 788 (see synon.).
Pempheris mangula, *Day, Fish. India*, p. 175, pl. xlii, fig. 3 (not *Cuv. & Val.*).

Moonda-kun-karawa, Tamil.

D. 6/9. P. 17. V. 1/5. A. 3/42–46. C. 17. L. l. 60–64.

Length of head 5, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{4}$ to $2\frac{1}{2}$ in length of head. Interorbital space slightly concave. Preopercle having rather a strong denticulation on intramarginal edge near angle. *Fins*—soft dorsal highest anteriorly, rapidly decreasing in height to the last ray. Pectoral a little longer than head. Ventral reaches anal. Anterior portion of anal highest and equal to two fifths of the body; caudal emarginate. *Colour*—violet-brown above, becoming silvery below. Fins roseate with fine dots; axilla and base of pectoral light coloured.

Hab. Seas of India; obtained at Kyoukhpyoo by Colonel Tickell.

850. (2.) **Pempheris russellii.** (Fig. 46.)

Mangula-kutti, *Russell, Fish. Vizag.* ii, p. 10, pl. 114.
Pempheris molucca, *Day, Fish. India*, p. 175, pl. xlii, fig. 2 (not *Cuv. & Val.*).
Pempheris russellii, *Day, Fish. India, Suppl.* p. 788 (see synon.).

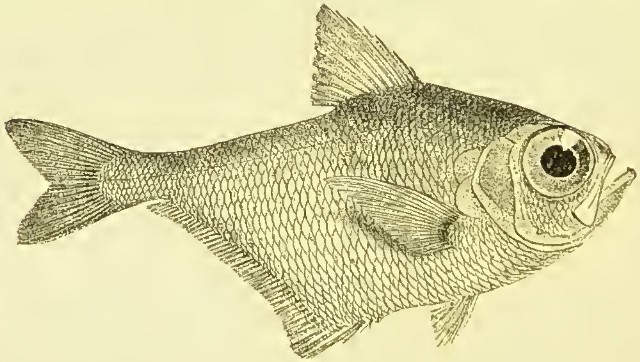

Fig. 46.—*Pempheris russelli.*

D. 6/9. P. 18. A. 3/40–42. C. 17. L. l. 56. Cæc. pyl. 6–7. Vert. 10/14.

Length of head $3\frac{2}{3}$, height of body $2\frac{1}{2}$ in the total length.

Eyes—diameter about 2 in length of head, $\frac{3}{4}$ diam. apart. Preopercle entire, but having three denticulations along its intramarginal border. *Fins*—dorsal spines weak, increasing in length to the last, which is scarcely so high as the first rays, the soft portion decreases posteriorly in height. Pectoral as long as head. Ventral short; anal highest in front; caudal forked. *Scales*—the rows along the lateral line larger than the others. *Colour*—silvery grey, upper third of dorsal rays black; pectorals orange, and usually having a dark base; anal rather dark anteriorly and inferiorly; caudal with its posterior margin stained grey.

Hab. Coast of Sind and of Indian Peninsula.

This species is identical with Russell's fish, but not with *P. mangula*, C. V., a form figured in Günther's 'Fische d. Südsee,' t. lix. f. B. Klunzinger's *P. mangula*, again, differs from both the others.

Family XII. POLYNEMIDÆ.

Branchiostegals seven; pseudobranchiæ. Body oblong, somewhat compressed. Eyes large, lateral, more or less covered by an adipose membrane; mouth on the lower side of a prominent snout, and having a lateral cleft. Muciferous system on the head well developed. Villiform teeth on the jaws and palatines; present or absent on the vomer. Two dorsal fins; several free articulated appendages below the pectoral fin; ventrals thoracic. Lateral line continuous, continued on to the caudal fin. Air-bladder, when present, varying in form and structure. Pyloric appendages of varying numbers.

Geographical Distribution. Tropical seas (not found in the Red Sea).

Uses. These fish are all excellent as food, and rough isinglass (fish-sounds) is obtained from some, and exported in large quantities.

1. Genus **POLYNEMUS**, Linn.

Syn. *Trichidion*, Klein; *Polistonemus*, Gill; *Eleutheronema*, Bleeker.

Kala, Tam.; *Nut-tiah*, Mugh.

Preopercle serrated. First dorsal fin with seven or eight weak spines; soft dorsal and anal of nearly equal extent; pectoral rays simple or branched, and having a varying number of free rays (3–7) at the base of the fin. Scales ctenoid, rather small, extended on to the vertical fins. Air-bladder, when present, varying in form, size, and structure. Pyloric appendages varying in number.

Synopsis of Indian Species.

A. Seven free pectoral rays.
    D. 7 | 1/15–16. Upper free pectoral rays
        twice the length of fish .... 1. *P. paradiseus*, p. 102.

D. 8 | 1/12–13. Free pectoral rays not extending beyond anal .... 2. *P. heptadactylus*, p. 103.
B. Six free pectoral rays.
a. Silvery, no air-bladder .... 3. *P. xanthonemus*, p. 103.
b. Golden, an air-bladder.
Free rays do not extend beyond ventrals. 4. *P. sextarius*, p. 104.
Free rays extend beyond ventrals ...... 5. *P. sexfilis*, p. 105.
C. Five free pectoral rays.
L. l. 70–75. Second dorsal as high as anal .... 6. *P. indicus*, p. 105.
L. l. 60–65. Second dorsal higher than anal .... 7. *P. plebeius*, p. 106.
D. Four free pectoral rays .... 8. *P. tetradactylus*, p. 106.

851. (1.) Polynemus paradiseus.

Polynemus paradiseus, *Linn. Syst. Nat.* p. 522; *Day, Fish. India*, p. 176, pl. xlii, fig. 4 (see synon.).

Tupsee muchee, Beng.; *Nga-poongna*, Burm., *Mangoe fish.*

D. 7 | 1/15–16. P. 15 + vii. A. 2/12. L. l. 70. L. tr. 5/14. C. pyl. 5 (10).

Length of head 6 to $6\frac{1}{2}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—minute in the young, in the adult diameter 8 in length of head, 2 diam. from end of snout, and 3 apart. The maxilla extends upwards of two diameters behind posterior edge of orbit. Preopercle serrated and having a soft, produced, and rounded angle; the other opercles entire. A small spine on the shoulder. *Fins*—spines of first dorsal weak, the second slightly the longest; first ray of second dorsal equals in length the base of the fin, which is highest anteriorly, its upper edge concave. Pectoral rays undivided; the fin has seven free rays below its base, the three superior being the longest, strongest, and about twice the length of the fish. Anal commencing under second dorsal and of the same height, its lower edge emarginate. Caudal deeply forked, upper lobe the longer. *Lateral line*—forms a gradual curve, and becomes lost at the centre of the base of the caudal fin. *Air-bladder*—absent. *Colour*—generally golden, with a shade of grey along the back; dorsal fins also stained greyish with a slight tinge of the same shade, so are also the caudal, the pectoral, and upper pectoral appendages.

Buchanan observed: "Those who officiate in the temple of *Sib* are called *Tapasi* in the vulgar dialect, and *Tapasivi* in Sangskritta, that is to say penitents. They ought not to shave, on which account a fish called *Mangoe* fish by the English of Calcutta, which has long fibres proceeding from near its head, is called by the same name."

Hab. Indian seas, Bay of Bengal at least as low as Caconada, also along the coasts of Burma to the Malay Archipelago, entering rivers for spawning-purposes, and generally during the S.W. monsoon and the cold months. This species is considered a great

luxury for the table, and commences to be taken in numbers about June. It attains 9 inches in length.

Col. Tickell observed that along the coasts of Burma this fish is inferior as food to those in Bengal; that it remains in estuaries throughout the year except in the depth of the rains, and is always of the same value as food, whereas in Bengal it ascends rivers in May and June, and is then in its primest condition.

852. (2.) Polynemus heptadactylus.

Polynemus heptadactylus, *Cuv. & Val. H. N. Poiss.* iii, p. 390; *Day, Fish. India,* p. 177, pl. xlii, fig. 5 (see synon.).

D.8 | 1/12–13. P.15+vii. A.3/11–12. L.l.50–52. L.tr.5/11. C.p.4.

Length of head 5, height of body 4 in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. The maxilla reaches to half a diameter behind the posterior edge of the eye; interorbital space nearly flat. Preopercle strongly serrated, having a well-developed spine just above its angle, which is rounded and produced. A spine on shoulder at the commencement of the lateral line. *Fins*—first dorsal spine short, the third the longest, the last scarcely one third of its height; second dorsal highest anteriorly, upper edge of the fin concave. Pectoral rays unbranched, the free appendages reach to base of anal, the upper being the longest. Anal highest anteriorly, where it equals the first dorsal, its lower edge straight. Caudal deeply lobed. *Air-bladder*—absent. *Colour*—golden, pectoral nearly black; edge of first dorsal, upper edge of second dorsal, margins of caudal, lower half of anal, and tip of ventral also black.

Hab. Seas of India to the Malay Archipelago; attaining at least 6 inches in length.

853. (3.) Polynemus xanthonemus.

Polynemus xanthonemus, *Cuv. & Val. H. N. Poiss.* vii, p. 517; *Day, Fish. India,* p. 177 (see synon.).

D. 8 | 1/11. P. 15+vi. A. 3/11–12. Cæc. pyl. 12.

This fish is said to resemble *P. sextarius* more than *P. sexfilis*. *Fins*—six free pectoral rays extend beyond end of ventral. Although the caudal lobes are not more elongated than in *P. sextarius* (one fifth of the total length), the fin is more deeply cleft. *Air-bladder*—absent. *Colour*—back greenish, sides and abdomen silvery; the fins yellow with a black border, the free rays are the same colour as the fins.

Hab. Seas of India to China; attaining at least 6 inches in length. I have not recognized this species in India.

854. (4.) Polynemus sextarius. (Fig. 47.)

Polynemus sextarius, *Bloch, Schn. Syst. Ich.* p. 18, t. iv; *Day, Fish. India*, p. 177, pl. xlii, fig. 6 (see synon.).

Ravás, Maráthi; *Nga knyin ko*, Arracan.

D.8 | 1/12–13. P.14 + vi. A.3/12–13. C.17. L.l.48–50. L.tr.5/10.

Length of head 4 to $4\frac{1}{4}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{3}{4}$ in length of head, $\frac{2}{5}$ to $\frac{3}{4}$ diam. from end of snout, and about 1 apart. The maxilla reaches to behind the posterior edge of the orbit. Vertical margin of preoperele denticulated, with a rather strong tooth just above its angle, which is rounded, produced, and entire. *Teeth*—villiform,

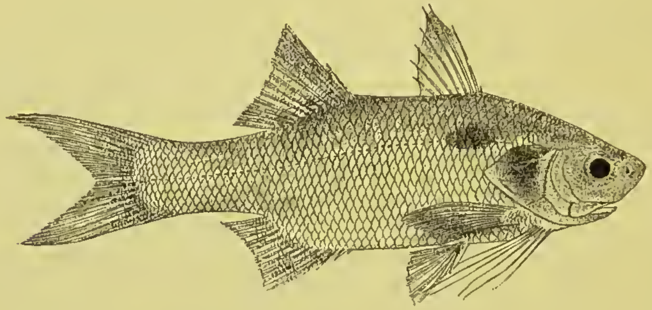

Fig. 47.—*Polynemus sextarius.*

those on the vomer in a transverse band, whilst the palatine band is semi-interrupted. *Fins*—dorsal spines with rather filamentous terminations, the third highest and as long as highest ray in second dorsal; the height of second dorsal and anal are nearly the same, but the former has the longer base; upper edge of second dorsal fin scarcely, if at all, emarginate. Pectoral rays branched; the free rays at the base of the fin reach to the middle of the ventral fin, occasionally to its end; caudal rather deeply forked. A spine on the shoulder at the commencement of the lateral line. *Air-bladder*—small and simple. *Cæcal appendages*—long and rather numerous. *Colour*—golden, the upper half of the first dorsal black-spotted; pectoral and ventral with numerous black spots, the former sometimes almost black; other fins more or less dotted with black and often black-edged. A large black spot on the shoulder on the lateral line from the second to the eighth scales.

Hab. East coast of Africa, seas of India to the Malay Archipelago. Common on the Indian coasts, and growing to $7\frac{1}{2}$ inches in length.

855. (5.) Polynemus sexfilis.

Polynemus sexfilis, *Cuv. & Val. H. N. Poiss.* vii, p. 515; *Day, Fish. India,* p. 178, pl. xliii, fig. 1 (see synon.).

D. 8 | 1/12–13. P. 15+vi. A. 3/11–12. L. l. 46. L. tr. 5/10.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. The maxilla reaches half a diameter behind the orbit. Vertical margin of preopercle strongly denticulated, with a rather strong tooth above its rounded, produced, but entire angle. *Teeth*—villiform in jaws, in a semilunar band on the vomer, and in an interrupted one on the palatines. *Fins*—third dorsal spine highest; second dorsal one fourth higher anteriorly than the anal, its upper edge rather concave. The pectoral rays unbranched, the free ones reach to rather beyond the end of the ventral; base of anal slightly longer than that of second dorsal; caudal deeply forked. A spine on the shoulder at the commencement of the lateral line. *Cæcal appendages*—long and rather numerous. *Air-bladder*—large. *Colour*—golden; pectoral deep black; a lower black edge to the anal; ventral dark in the middle.

Hab. Seas of India and Mauritius.

856. (6.) Polynemus indicus.

Polynemus indicus, *Shaw, Zool.* v, p. 155; *Day, Fish. India,* p. 179 (see synon.).

Maga-booshee, Tel.; *Tahlun-kala*, Tam.; *Yeta*, Mal.; *Dara*, Bombay; *Bhāt*, Mahr.; *Lukwah*, Arrac.; *Ka-ku-yan* or *Katha* (young), Burm.; *Kway-yeng*, Tavoy.

D. 8 | 1/13–14. P. 15+v. A. 2–3/11–12. L. l. 70–75. L. tr. 7/13.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 6 in the total length (excluding the filamentous prolongation of the tail). *Eyes*—diameter 7 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 2 apart. The maxilla reaches to far behind the orbit. Preopercle with a rounded and produced angle, its posterior margin moderately serrated, and having a strong tooth above its angle. Interorbital space rather flat. *Teeth*—in a somewhat semilunar band on the vomer, and in a wide cuneiform band, broadest anteriorly, on the palatines, the last emarginate internally about its middle. *Fins*—spines of first dorsal weak, the third having a rather filamentous prolongation, the fin one third higher than long; second dorsal highest in front, where it equals the anal and is one third higher than its base is long; upper edge of the fin concave. Pectoral with its rays branched, having five articulated free rays, the upper of which is the longest, reaching nearly to the anal; the latter fin extends posteriorly some distance behind the vertical from the end of the second dorsal, and is concave below. Caudal deeply lunate, with pointed lobes, which usually have filamentous terminations, the lower mostly the longer. *Air-bladder*—oval and thick, occupying the entire length of the abdomen, and posteriorly

prolonged amongst the caudal muscles; it adheres to the vertebræ from the third to the seventh, whilst from either side towards the ventral surface it has from 28 to 35 appendages. *Lateral line*—continued along the lower caudal lobe almost to its end. Vertical fins rather densely scaled. *Colour*—back purplish black, abdomen silvery white dashed with gold. First and second dorsals and anal stained with black, as is likewise the lower half of the opercle. Caudal with many black points.

Hab. Seas of India to the Malay Archipelago and Australia. This species attains 4 feet in length, but is rarely above 20 lbs. weight. A large fish yields about 2 oz. of rough isinglass. The largest specimens appear to be captured in the embouchures of large rivers; they take a bait freely.

857. (7.) Polynemus plebeius.

Polynemus plebeius, *Broussonet, Ich.* fasc. i, t. viii; *Day, Fish. India*, p. 179 (see synon.).

D. 8 | 1/13. P. 17+v. A. 2-3/11. L. l. 60-65. L. tr. 7-8/13.

Length of head $4\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $3\frac{3}{4}$ to $4\frac{1}{3}$ in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Interorbital space rather convex. The maxilla reaches to about 1 diameter behind the posterior edge of the eye. Angle of preopercle rounded and produced; its vertical margin rather coarsely serrated and most so above the angle. *Fins*—third dorsal spine with a rather filamentous prolongation, and three fourths the height of body. Second dorsal rather higher anteriorly than the first or than the anal, its upper edge deeply concave. Pectoral rays unbranched, of its five free rays the superior reaches rather beyond the ventral. First spine of anal minute or wanting; lower edge of fin deeply concave. Caudal with pointed lobes. *Air-bladder*—elongate, narrow, and simple. Vertical fins rather densely scaled. *Lateral line*—continued along the lower lobe of the caudal fin to the end of its second or third rays below its centre. *Colour*—golden, having a greyish tinge along the back and darkish lines along each row of scales; anal fin dashed with grey, ventral white and externally greyish; both dorsals, the caudal, and pectoral grey-edged.

Hab. This species is exceedingly common in the seas and estuaries of India. I have captured females full of roe as early as March. It is found from Sind through the seas of India to the Malay Archipelago and beyond.

858. (8.) Polynemus tetradactylus.

Polynemus tetradactylus, *Shaw, Zool.* v, p. 155; *Day, Fish. India*, p. 180 (see synon.).

Rávas cheláchi, Maráthi; *Maga-jellee*, Tel.; *Polun-kala*, Tam.; *To-bro-dah*, Andam.; *Lákwa*, Arracan.

D. 8 | 1/13-15. P. 17+iv. A. 2-3/15-17. L. l. 75-85. L. tr. 8/14.

Length of head 5, height of body 5 to 6 in the total length.

Eyes—diameter $4\frac{1}{2}$ to 5 in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. The maxilla extends 1 diameter behind posterior edge of orbit. Angle of preoperele produced and rounded, its vertical margin serrated and having its strongest denticulation just above the angle. *Fins*—third dorsal spine equals three-fourths height of body, and is as long as the anterior rays of the second dorsal, the upper edge of which fin is concave. Pectoral rays undivided; the free rays reach nearly to the end of the ventral, which latter extends to the vent. Anal similar to second dorsal, its first spine minute or absent; caudal deeply forked. *Air-bladder*—absent. *Cæcal appendages*—numerous. *Colour*—silvery green, becoming yellowish white on the sides and abdomen; dorsal and caudal greyish, with minute black points, and nearly black at the edges; ventral and anal pale orange in their outer halves; pectoral filaments white. A dark mark on the upper portion of the opercle.

Hab. Seas of India to the Malay Archipelago and China; attaining 6 feet and upwards in length. This species is excellent eating, and appears to ascend higher up the rivers than any of the others, and the young are numerous in the Hooghly at Calcutta. Ham. Buchanan observes:—"I have been assured by a credible native that he saw one which was a load for six men, and which certainly therefore exceeded in weight 320 lbs. avoirdupois" (*Fish. Ganges*, p. 225).

Family XIII. SCIÆNIDÆ.

Branchiostegals seven. Body somewhat compressed and rather elongate. Mouth in front of or below the snout. Cheeks unarmed; opercles sometimes with weak spines. Barbels present in a few genera. Muciferous system on the head well developed. Teeth in villiform bands, with the outer or inner row often enlarged; canines present in some genera; palate edentulous. Two dorsal fins, the second much more developed than the first or than the anal; anal with one or two spines; pectoral rays branched; ventrals thoracic, 1/5. Scales ctenoid or cycloid, covering the head and snout, placed in oblique and often sinuous rows on the body. Lateral line complete, often continued on to the caudal fin. Stomach cæcal. Air-bladder, when present, as a rule with branching or elongated appendages. Pyloric appendages generally few.

Geographical Distribution. Indian and Atlantic Oceans. Not found in the Pacific or the Red Sea. Numerous on the Indian coast, many kinds entering estuaries and rivers.

Uses. The air-bladders of many of these fishes are extensively collected along the coasts of India for making isinglass.

Synopsis of Indian Genera.

A. No large canines in front of jaws.
   Upper jaw overlapping lower. A barbel under mandibular symphysis........................ 1. UMBRINA.

No barbel. Eyes 1 to $1\frac{1}{2}$ diameters apart	2. SCIÆNA.
No barbel. Eyes 2 to 3 diameters apart. Cleft of mouth oblique and deep	3. SCIÆNOIDES.
B. Large canine-like teeth in front of jaws. Lower jaw longest	4. OTOLITHUS.

1. Genus UMBRINA, Cuv.

Syn. *Menticirrhus* and *Cirrimens*, Gill; *Sciæna* (Artedi), Bleeker, 1874.

Pseudobranchiæ present. Body oblong. Eyes of moderate size. Interorbital space rather broad and somewhat convex. Snout rounded and overhanging the upper jaw, which is longer than the lower. A central barbel present below the symphysis of the lower jaw. Teeth villiform, with the outer row in the premaxillaries enlarged; no canines. Two dorsal fins, the first with 9 or 10 spines and connected at its base to the second, which is of moderate length (24 to 30 rays); anal with two spines. Scales more or less present on the vertical fins and on that of the tail. Air-bladder present. Pyloric appendages in moderate numbers or few.

The open pores or orifices of some of the muciferous channels of the head are very distinct. There are three or five in a transverse row across the snout, whilst along the free edge of the skin between the two preorbitals, over the groove for the posterior limb of the premaxillaries, there are five more. The central one is mostly triangular, the largest, and at the upper surface; whilst along its free edge, sometimes below it, are two more on either side. The existence of a lateral lobe is entirely due to these orifices, and its size is in accordance with their position. On the lower surface of the mandible beneath the symphysis is a single central barbel having a pore at its base; occasionally it has one in front and another behind it. On either side of its base laterally and rather posteriorly are two more open orifices.

Geographical Distribution. Indian Ocean, Mediterranean, and Atlantic, and some rivers of North and South America.

Synopsis of Indian Species.

L. l. 48. Barbel half as long as the eye. First dorsal fin two fifths the height of body ..	1. *U. macroptera*, p. 108.
L. l. 44. Barbel quarter as long as the eye. First dorsal fin one half height of body ..	2. *U. sinuata*, p. 109.
L. l. 52. Barbel half as long as eye. First dorsal fin from four fifths to as high as body .	3. *U. dussumieri*, p. 110.
L. l. 44. Barbel sometimes nearly as long as the eye. First dorsal fin four ninths height of body	4. *U. russellii*, p. 110.

859. (1.) Umbrina macroptera.

Umbrina macroptera, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 254; *Day, Fish. India,* p. 182 (see synon.).

D.10 | 1/28–30. P.17. A.2/7. L.r.50/48/45*. L. tr. 5–6/15. C.p.11.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to $4\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. The snout rather inflated and prominent. Distance between eye and maxilla equals 1 diameter of orbit. Preopercle serrated, most coarsely so at its angle; two opercular points. Barbel below symphysis of lower jaw nearly half diameter of eye in length. *Fins*—dorsal spines weak, first very short, second to fourth about the same length and equal to two fifths the height of the body and more than twice as high as the rays. Second anal spine of moderate strength, one third shorter than the first ray, and $\frac{4}{9}$ of the height of the body. Caudal rather wedge-shaped. *Scales*—cycloid on the head, chest, and as high as the base of the pectoral fin; the remainder ctenoid. *Lateral line*—becomes straight opposite the posterior end of the anal fin; the tubes give off a branch on either side which rarely subdivides. *Colour*—greyish, becoming silvery on the abdomen, and everywhere covered with minute black dots. Fins yellowish, dotted like the body. A dark mark on the opercle.

Hab. Seas of India to the Malay Archipelago. I took a female, 8 inches long, with fully developed ova in April 1868. Not uncommon at Madras.

860. (2.) **Umbrina sinuata.** (Fig. 48.)

Umbrina sinuata, *Day, Fish. India,* p. 182, pl. xlvi, fig. 1, *and Suppl.* 1888, p. 788 (see synon.).

D. 10 | 1/27–29. P. 17. A. 2/7. C. 17. L. l. 44–50. L. tr. 7/12.

Length of head $4\frac{1}{2}$ in the young to $3\frac{2}{3}$ in adults, height of body $3\frac{1}{4}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in the young to $5\frac{1}{2}$ in the adult in the length of the head, $\frac{3}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Distance between eye and upper jaw equals three fourths diameter of orbit. Snout obtuse, swollen. Preopercle serrated, most coarsely at its angle, becoming blunted with age; two opercular spines. Shoulder-flap serrated. Central barbel below the symphysis of the lower jaw one fourth the length of the orbit; two open pores on either side. *Fins*—dorsal spines weak, the third to the fifth the longest, one fourth higher than the rays. Second anal spine strong. Caudal wedge-shaped. *Scales*—those on the summit of the head as far as the occiput very much smaller than those on the body. *Colour*—brownish silvery, everywhere covered with minute dark points. A diffused bluish spot on the opercle. Nine wide sinuous brown bands on the body, wider than the ground-colour, passing from the back downwards and forwards; a dark spot in the axilla. First dorsal black, a black band along the whole length of the soft dorsal. Anal similar

* That is, 48 scales in the lateral line, 50 rows above and 45 below.

to soft dorsal. Ventral black. Caudal yellow, with a black tip and white outer edge. In an adult the sinuous black bands are more numerous, apparently being the outer edges of the wider bands seen in the younger fish.

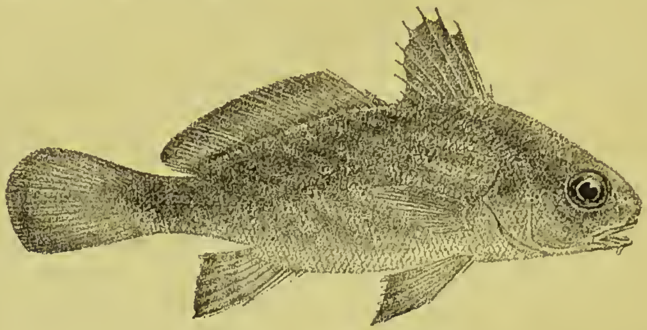

Fig. 48.—*Umbrina sinuata.*

Hab. Karachi; a specimen, about 17 inches long, from Muscat is in the British Museum.

861. (3.) Umbrina dussumieri.

Umbrina dussumieri, *Cuv. & Val. H. N. Poiss.* ix, p. 481; *Day, Fish. India*, p. 183, pl. xliii, figs. 2, 3 (see synon.).

Taru kattelee, Tam.

D. 10 | 1–2/24–27. A. 2/7–8. L.r. 58–64/52/55. L.tr. 6/17. C.p. 7–9.

Length of head 4 to $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $1\frac{1}{4}$ diam. apart and from end of snout. Snout obtuse, it and the cheeks inflated; cleft of mouth nearly horizontal. Distance between the eye and the upper maxillary bone equals one diameter of the orbit. Preopercle crenulated (scarcely denticulated) in its whole extent, its angle rounded; two opercular spines. Central barbel below the chin about half a diameter of the eye in length; a deep pore exists on either side of its base; pores on snout generic. *Fins*—dorsal spines weak, the first short, the two next longest and three times as long as the rays. Second anal spine rather above half the height of the first ray. Caudal wedge-shaped in the young, more obtuse in the adult. *Colour*—usually dark brown or coppery, often nearly black and shot with golden, lightest along the abdomen. Fins reddish brown, first dorsal stained black; other fins with grey edges; ventrals yellow.

Hab. Seas of India to China; attaining at least 8 or 9 inches in length.

862. (4.) Umbrina russellii.

Umbrina russellii, *Cuv. & Val. H. N. Poiss.* v, p. 178; *Day, Fish. India*, p. 183, pl. xliii, fig. 4 (see synon.).

Qualar-katchelee, Tel.

D. 10 | 1/24–27. A. 2/7. L. r. 52/44/42. L. tr. 6/5. Cæc. pyl. 7.

Length of head 4 to $4\frac{1}{3}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and 1 apart. Distance between the eye and the upper jaw equals $\frac{3}{4}$ of a diameter of the orbit. Preopercle distinctly serrated; two opercular spines. Barbel equals from $\frac{2}{5}$ of the diameter of the eye to nearly as long as it. *Fins*—dorsal spines moderately strong, the fourth longest and one third longer than the rays. Second anal spine strong, four fifths as long as the first ray. Caudal wedge-shaped. *Scales*—ctenoid. *Colour*—grey, becoming silvery white on the abdomen; a steel-blue opercular spot; upper two thirds of first dorsal nearly black; other fins yellow.

Hab. Seas of India to the Malay Archipelago; attaining at least 10 inches in length.

2. Genus **SCIÆNA** (Artedi), Cuv.

Syn. *Johnius*, Bloch; *Corvina* and *Stellifer*, Cuv.; *Bola*, sp., Ham. Buch.; *Leiostomus*, Cuv. & Val.; *Coracinas*, Pall.; *Homoprion*, Holb.; *Amblyodon* (Raf.), Gir.; *Cheilotrema*, v. Tsch.; *Genyonemus*, *Plagioscion*, *Sciænops*, *Bairdiella*, *Haploinodotus*, *Rhinoscion*, and *Ophioscion*, Gill; *Diplolepis*, Steind.; *Pseudosciæna*, Bleeker.

Dhoma, Maráthi.

Pseudobranchiæ present. Body oblong. Eyes of moderate size. Interorbital space rather broad and slightly convex. Snout rounded, sometimes overhanging the upper jaw. Teeth villiform, with an outer enlarged row in the premaxillaries, and sometimes the inner row in the mandibles enlarged. No distinct canines. Two dorsal fins, the first with 9 or 10 spines, and connected at its base to the second, which is of moderate length (23–32 rays). Anal with one or two spines. Scales ctenoid or cycloid, extending over head and snout, and generally more or less present on the vertical fins including the tail. Air-bladder present *. Pyloric appendages in moderate numbers or few.

Pores or the orifices of muciferous canals are found in most of the species of this genus, as described in *Umbrina*. But a few, evidently approaching towards *Otolithus*, have some or all absent from both jaws. In one species, *Sciæna albida*, a small, though distinct barbel is present in front of the lateral open pores on the lower jaw.

Synopsis of Indian Species.

A. An inner row of enlarged teeth in lower jaw. (*Pseudosciæna.*)

a. Second anal spine weak, $\frac{2}{3}$ length of rays or less.

Jaws about equally long; 4th, 5th, and 6th anal spines longest. L. tr. 9–10/18. 1. *S. bleekeri*, p. 112.

Upper jaw longer; 2nd to 5th dorsal spines longest. L. tr. 6/14 .... 3. *S. vogleri*, p. 113.

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* Stated to be absent in some American species.

Jaws subequal (or upper rather longer); 3rd and 4th dorsal spines longest. L. tr. 8/14 .... 4. *S. sina*, p. 114.
Upper jaw longer; 3rd an 4th dorsal spines longest. L. tr. 7/18.......... 9. *S. diacanthus*, p. 118.
Lower jaw longer; 2nd to 5th dorsal spines longest. L. tr. 8–9/18.......... 10. *S. aneus*, p. 119.
Upper jaw longer, 3rd to 7th dorsal spines longest. L. tr. 8/16 .... 11. *S. maculata*, p. 119.

b. Second anal spine strong, ¾ length of first ray or more.

Longest dorsal spines 2nd and 3rd. L. tr. 8/16 .... 2. *S. miles*, p. 113.
Longest dorsal spines 2nd to 4th. L. tr. 7/16 .... 5. *S. cuja*, p. 115.
Longest dorsal spines 2nd to 4th. L. tr. 5–6/15 .... 6. *S. coitor*, p. 115.
Longest dorsal spines 4th and 5th. L. tr. 6–7/14 .... 7. *S. axillaris*, p. 116.
Longest dorsal spine 3rd. L. tr. 7/18 .. 8. *S. albida*, p. 117.

B. No inner row of enlarged teeth in lower jaw. (*Johnius*.)

a. Upper jaw longest, overhung by snout; outer ventral ray prolonged.

Second anal spine moderate. L. tr. 6/14. 12. *S. belangeri*, p. 120.
Second anal spine strong. L. tr. 8–9/25. 13. *S. semiluctuosa*, p. 121.
Second anal spine strong. L. tr. 6/18. . 14. *S. glauca*, p. 122.
Second anal spine weak. L. tr. 5–6/18. 15. *S. carutta*, p. 122.

b. Jaws subequal; no prolonged ventral ray. L. tr. 6/15 .... 16. *S. ossea*, p. 123.

863. (1.) Sciæna bleekeri.

Sciæna bleekeri, *Day, Fish. India*, p. 185, pl. xlv, fig. 4.

Soh-lee, Baluchi.

D.10 | 1/24–27. P.17. A.2/7. C.17. L.r.85–90/60/70. L.tr.9–10/18.

Length of head 4¼, height of body 4¾ in the total length. *Eyes*—diameter 5 to 7 in length of head, 1¼ to 2 diam. from end of snout, and 1 apart. Greatest width of head equals ⅖ of its length. Dorsal profile more convex than that of abdomen, a slight concavity over the eyes. Snout not overhanging jaws, cleft of mouth somewhat oblique, the jaws of about the same length anteriorly. Distance between eye and upper edge of maxilla equals ⅔ diameter of orbit. Preopercle with some rather strong denticulations and three well-marked ones at the angle; two opercular spines. Shoulder-scale strongly serrated. A pore above centre of free edge of skin of snout, and a smaller one on either side, but no lateral lobe. Five pores on under surface of lower jaw below symphysis. *Teeth*—the inner row in the lower jaw is much larger than the rest of the teeth. *Fins*—4th to 6th dorsal spines of about the same height, one third higher than rays and equal to about ⅖ height of body. Second anal spine weak, half length of first ray and about equal to 1½ diameters of the orbit. Caudal well-shaped.

Scales—cycloid on snout and under the eyes, ctenoid elsewhere. *Lateral line*—the tubes have simple bifurcations. *Colour*—silvery grey along the back, becoming dull white below; a black spot in the axilla. First dorsal grey with a light line along its centre; caudal dark in its outer third, fins otherwise yellowish.

Hab. Bombay, whence two specimens were procured. Large specimens from 27 inches in length are not uncommon at Gwádar, where the fish is extensively salted.

864. (2.) Sciæna miles.

Sciæna miles, *Cuv. & Val. H. N. Poiss.* v, p. 94; *Day, Fish. India*, p. 185, pl. xliii, fig. 5 (see synon.).

Vella kattelee, Tam.; *Tella katehelee*, Tel.

D.9–10 | 1/28–30. P.17. A.2/7. C.17. L.r.62–65/50/55–60. L.tr.8/16.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Greatest width of head equals half its length. Cleft of mouth moderately oblique. Snout not overhanging the jaws, which are of about equal length, or the upper slightly the longer. Preopercle with some rather widely separated denticulations especially at its rounded angle; two opercular points. Free border of skin of snout with five orifices of canals and a small lateral lobe; five pores on inferior surface of lower jaw. *Teeth*—villiform in lower jaw with the inner row distantly placed and enlarged. *Fins*—dorsal spines weak, nearly twice as long as the rays, and from $\frac{2}{5}$ to $\frac{1}{2}$ as high as body. Second anal spine very strong, nearly as long as the first ray, and from $\frac{1}{2}$ length of head to its length behind middle of eyes; base of fin from $\frac{1}{5}$ to $\frac{1}{4}$ of that of soft dorsal. Caudal wedge-shaped. *Scales*—cycloid on head and chest, ctenoid on remainder of body. *Lateral line*—tubes arborescent posteriorly. *Colour*—greyish darkened with green along the back, becoming white on the sides and abdomen, sometimes a small brown spot in front of each dorsal ray. Outer edges of the fins in some specimens dark except the ventral, which is white.

Hab. Seas of India to the Malay Archipelago, and recorded from Mozambique; attaining at least two feet in length.

865. (3.) Sciæna vogleri.

Otolithus vogleri, *Bleeker Batavia Nat. Tijdsch.* iv, p. 253.
Sciæna vogleri, *Day, Fish. India*, p. 186, pl. xlv, fig. 1 (see synon.).

D.10 | 1/28–29. P.19. A.2/7. L.r.52/50/48. L.tr.6/14. Cæc. pyl. 9.

Length of head $3\frac{2}{3}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $4\frac{2}{3}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Dorsal profile more convex than abdominal. Width of head equals $\frac{4}{7}$ of its length. Snout does not

overhang upper jaw, which is very slightly longer than lower, cleft of mouth oblique. Preopercle distinctly but finely serrated; two opercular spines; the distance between eye and maxilla equals 1 diameter of orbit. Five large open pores under symphysis of lower jaw, also five orifices along the free edge of the skin of the snout. The shoulder-scale serrated. *Teeth*—an internal row large, conical, and rather widely separated in the lower jaw. *Fins*—dorsal spines of moderate strength, second to fifth subequal in length, $\frac{1}{2}$ to $\frac{4}{9}$ height of body and $\frac{1}{3}$ higher than rays. Second anal spine weak, half height of first ray, and $\frac{2}{9}$ of that of the body. Caudal wedge-shaped. *Scales*—cycloid on the head, ctenoid over the chest and body; base of soft dorsal rather thickly scaled. *Lateral line*—tubes with one or two branches. *Colour*—silvery, glossed with golden; first dorsal dotted with black, most distinctly so in its upper half; superior edge of soft dorsal and last half of caudal grey; a small dark spot sometimes present in the axilla; fins yellow.

Hab. Seas of India to the Malay Archipelago. The longest specimen I have taken measured $10\frac{1}{2}$ inches.

866. (4.) Sciæna sina.

Corvina sina, *Cuv. & Val. H. N. Poiss.* v, p. 122.
Sciæna sina, *Day, Fish. India*, p. 186, pl. xliv, fig. 2 (see synon.).

Gul, Gomer, and *Kadakada,* Arabi; *Booroo* and *Souwah* or *Soor,* Sind.; *Goal,* Bel.

D. 10 | 1/27–29. A. 2/7–8. L. r. 52/52/46. L. tr. 8/14. Cæc. pyl. 9.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Width of head equals $\frac{4}{7}$ of its length. Snout rather inflated, scarcely overhanging the jaws; jaws of nearly equal length anteriorly; cleft of mouth nearly horizontal. Distance from eye to upper jaw $\frac{1}{2}$ to $\frac{3}{4}$ diameter of orbit. Preopercle rounded, generally some distinct spiny teeth at its angle. Snout with three pores across its base; free edge of skin with a large central opening, and another externally on either side, no large lateral lobe; shoulder-flap serrated. Five open pores under symphysis of mandible. *Teeth*—villiform, with an inner enlarged row in the mandible. *Fins*—dorsal spines rather weak, third and fourth the longest and four-ninths height of body. Second anal spine more than half height of first ray, and four-fifteenths of height of body; base of fin $\frac{2}{7}$ of that of soft dorsal. Caudal wedge-shaped. *Air-bladder*—large anteriorly, bulging on either side like a hammer whilst from it descends an appendage on each side; posteriorly it ends in a sharp point. *Scales*—ctenoid, except on the head, where they are cycloid, a few on bases of soft dorsal and anal. *Lateral line*—each tube gives off a branch on either side. *Colour*—silvery, tinged with brownish along the back, and shot with gold on abdo-

men; first dorsal blackish, especially in its outer half, the other fins grey.

Hab. Seas of India; attaining several feet in length.

McClelland, in his paper on isinglass (Calc. Journ. N. H. iii, p. 173), refers the *Soor* (spelt *Seer*) fish from which the sounds are collected, at Karáchi, to a *Polynemus*; but it is a *Sciæna*, and either the species described above or *S. glaucus*.

867. (5.) Sciæna cuja.

Bola cuja, *Ham. Buch. Fish. Ganges*, pp. 81, 369, pl. xii, fig. 27.
Sciæna cuja, *Day, Fish. India*, p. 187 (see synon.).

Nga-wé-young, Arracan; *Danteena*, Chittagong.

D. 10 | 1/27–29. P. 17. A. 2/7. C. 17. L. r. 60/50/54. L. tr. 7/16.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of snout and also apart. Profile along upper surface of head somewhat concave; snout not swollen; jaws of nearly the same length anteriorly, or the lower slightly the longer. Greatest width of head equals $\frac{4}{9}$ of its length. Cleft of mouth somewhat oblique. The distance between the eye and the upper jaw is $\frac{2}{3}$ diameter of orbit. Preopercle scarcely denticulated; two opercular spines. Three open pores across base of snout, and five large ones along edge of free portion of skin, but no lateral lobe. One central pore below symphysis of lower jaw, and two large ones on either side posterior to it. *Teeth*—the inner row in the lower jaw is slightly larger than the villiform bands. *Fins*—dorsal spines strong, second to fourth longest, one third higher than rays, and equal to length of postorbital portion of head. Second anal spine very strong, nearly or quite as long as first ray and equalling length of head behind middle of eyes. Caudal rounded. *Scales*—cycloid on the head, ctenoid on the body, the basal third of the soft dorsal and anal densely scaled; those on summit of head to end of occiput very much smaller than those on the body. *Lateral line*—the tubes divide posteriorly into many branches. *Colour*—oblique dark streaks, following the rows of scales, above the lateral line, horizontal ones below it. Both dorsals with two or three rows of black spots.

Hab. Estuaries of the Ganges, Burma and Japan; very common in the cold season at Akyab. This species attains to several feet in length.

868. (6.) Sciæna coitor. (Fig. 49.)

Bola coitor, *Ham. Buch. Fish. Ganges*, pp. 75 and 368, pl. 27, fig. 24.
Sciæna coitor, *Day, Fish. India*, p. 187, pl. xliv, fig. 3 (see synon.).

Botahl and *Putteriki*, Ooriah; *Nga-ta-dun* and *Nga-pok-thin*, Burm.

D. 10 | 1–2/26–29. A. 2/7. L. r. 58/50–55/52–56. L. tr. 5–6/15.

Length of head $4\frac{1}{4}$ to $4\frac{2}{3}$, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total

length. *Eyes*—diameter from 4 to $5\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $\frac{3}{4}$ to $1\frac{1}{3}$ apart. Greatest width of head equals $\frac{4}{5}$ of its length. Snout scarcely overhanging jaws, but prominent and swollen above, upper jaw somewhat the longer. Interorbital space nearly flat, and profile over eyes rather concave. The distance between eye and upper edge of maxilla from $\frac{3}{4}$ to 1 diameter of the eye. Preopercle serrated, most distinctly so at its angle; two weak opercular spines. Shoulder-flap finely serrated. Three small open pores across the snout, and five much larger ones along free edge of skin of snout; a well-developed lateral lobe. One central and two lateral orifices below symphysis of lower jaw. *Teeth*—an inner enlarged row in the lower jaw. *Fins*—dorsal spines weak, second to fourth the longest and equal to $\frac{2}{3}$ height of body and $\frac{1}{4}$ more than rays. Second anal spine rather strong, $\frac{4}{5}$ as high as first ray and equal to length of postorbital portion of head, length of base of anal from $\frac{2}{7}$ to $\frac{1}{4}$ of that of soft dorsal. Caudal

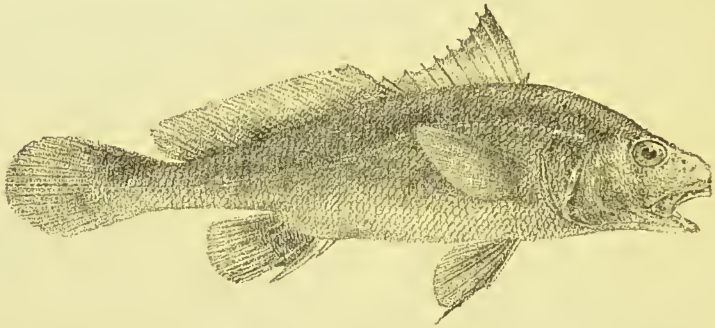

Fig. 49.—*Sciæna coitor.*

wedge-shaped. *Scales*—cycloid on the snout and below the eyes, elsewhere ctenoid. *Lateral line*—makes a gradual curve, and above the commencement of the anal becomes straight, its tubes give off a single branch on either side. *Colour*—silvery, shot with gold and purple, upper half of first dorsal blackish; soft dorsal, caudal, and anal dark externally; the last fin has a darkish basal band.

This fish appears to vary considerably. Burmese and Bengal adult specimens have 6 or 7 cæcal appendages, and an eye from $\frac{1}{5}$ to $\frac{2}{11}$ the length of the head. In Southern Madras, adults have 9 cæcal appendages and an eye about $\frac{1}{4}$ the length of the head. *Sciæna (Corvina) nasus*, Steind. Verh. z.-b. Ges. Wien, 1866, p. 771, t. xv, fig. 1, from Calcutta, is probably this species.

Hab. Throughout the larger rivers of India and Burmah, descending to the sea at certain seasons; and attaining a foot in length. The one figured (an adult) is from the Irrawaddy.

869. (7.) Sciæna axillaris.

Corvina axillaris, *Cuv. & Val. H. N. Poiss.* v, p. 113.
Sciæna axillaris, *Day, Fish. India*, p. 188, pl. xliii, fig. 6 (see synon.).

D.10 | 1/26–29. P.17. A. 2/7. L.r.54/50/52. L.tr. 6–7/14. C.p.9.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{1}{3}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile more convex than that of the abdomen. Greatest width of head equals $\frac{1}{2}$ its length; the jaws of about equal length. Vertical limb of preopercle serrated, most strongly so at its angle. Two opercular spines. Distance from eye to maxilla equals two thirds diameter of orbit; shoulder-flap with smooth edges. No open glands visible on the snout; no lateral lobes. A knob below symphysis of lower jaw and two open pores behind it on either side. *Teeth*—inner row in lower jaw twice as strong as the remainder. *Fins*—dorsal spines of moderate strength, 4th and 5th the longest, equal to $\frac{2}{5}$ height of body, and $\frac{1}{3}$ longer than the rays. First ventral ray elongate. Second anal spine strong, $\frac{3}{4}$ as long as first ray and $\frac{3}{7}$ the height of the body, length of base of anal $\frac{2}{7}$ of that of soft dorsal. Caudal wedge-shaped. *Scales*—cycloid on the head and as far as bases of pectoral and ventral fins, and to below middle of first dorsal, behind these places ctenoid. *Lateral line*—tubes arborescent posteriorly. *Air-bladder*—bifurcated anteriorly in the form of a hammer. *Colour*—silvery dashed with purple, a black spot in the axilla; upper two thirds of first dorsal black, and a dark tinge along the top of the first portion of the second; fins greyish.

Hab. Seas of India.

870. (8.) Sciæna albida.

Corvina albida, *Cuv. & Val. H. N. Poiss.* v, p. 93.

Sciæna albida, *Day, Fish. India,* p. 188, pl. xliv, figs. 4 & 6 (see synon.).

Vella kattelee and *Karoom kattelee,* Tam.

D. 9–10 | 1/24–25. A.2/7. L.r.55–60/52/50–55. L.tr.7/18. C.p.5.

Length of head $3\frac{3}{4}$ to 5, height of body 4 in the total length. *Eyes*—diameter 4 in the young to 7 in the adult in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout. Dorsal and abdominal profiles about equally convex in the adult. Greatest width of head equals half its length. Interorbital space very slightly convex; snout not overhanging the mouth. Jaws equal in front, or the upper slightly the longer, cleft of mouth slightly oblique. Preopercle with some serrations in the young, most developed at its angle, but which become indistinct in adult. Opercular spines indistinct. Three pores across the front of the snout; free edge of skin of snout with five orifices and a slight lateral lobe. A bluntish knob below symphysis of lower jaw, behind base of which is a large open pore, and two more on the side of either ramus; a short barbel exists between the central pore and anterior lateral one, and a very minute one at the posterior pore. *Teeth*—inner row in lower jaw enlarged and pointed. *Fins*—dorsal spines increase in length to the third, which is $\frac{1}{4}$ higher than rays, and from $\frac{4}{7}$ to $\frac{1}{2}$ height of body. Second anal spine strong, nearly as long

as first ray and $\frac{1}{2}$ or $\frac{2}{3}$ height of body. Caudal wedge-shaped in young, rounded in adult. *Scales*—cycloid on head, elsewhere ctenoid, fine ones covering the bases of soft dorsal and anal, and in adults whole caudal fin; those anterior to base of first dorsal much smaller than those posterior. *Lateral line*—tubes arborescent posteriorly. *Colour*—silvery, with a light streak along each row of scales; first dorsal in the young with a black interspinous membrane, but only having a black outer edge in the adult; second dorsal stained grey at the upper third. A dark bluish mark on the opercles, most distinct in the young. Ventral, anal, and caudal yellowish.

Hab. Seas of India (China ?); termed *Sapé katelé* at Pondicherry. This is a common species, but not in much esteem for the table; it attains to at least 3 feet in length.

871. (9.) Sciæna diacanthus.

Lutjanus diacanthus, *Lacép. H. N. Poiss.* iv, pp. 195, 244.
Sciæna diacanthus, *Günther, Catal.* ii, p. 290; *Day, Fish. India*, p. 189 (see synon.).

Nella katchelee, Tel.

D.10 | 1/23-24. P.18-19. A.2/7. L.r.72/52/60. L.tr.7/18. C.p.8.

Length of head 4 to $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 6 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout and also apart. Greatest width of the head equals $\frac{4}{7}$ of its length. Snout slightly inflated, upper jaw a little the longer, cleft of mouth oblique, distance from eye to upper jaw $\frac{2}{3}$ diameter of orbit. Margin of preopercle crenulated in the adult, in the immature the angle is denticulated; two opercular points. Snout with three open pores across its base, and three openings along the free edge of the skin, but no lateral lobe. Five open pores under symphysis of lower jaw. Shoulder-flap finely serrated. *Teeth*—an inner enlarged row in the mandibles. *Fins*—dorsal spines weak, increasing in length to third and fourth, which are $\frac{1}{4}$ higher than the rays, and $\frac{1}{2}$ to $\frac{4}{9}$ the height of the body. Second anal spine moderately strong, at least half as long as the rays and equal to $\frac{4}{11}$ length of head; length of base of anal $\frac{1}{3}$ to $\frac{2}{7}$ that of soft dorsal. Caudal wedge-shaped. *Scales*—ctenoid except on the snout and below the eyes. *Lateral line*—tubes arborescent posteriorly. *Colour*—brownish grey, shot with silver along the back, below the lateral line gradually fading to dull silvery grey; head of the same colour glossed with purple. Fins yellowish, with black dots. Eyes golden. In the *immature* up to a foot and a half in length or even more the fins are greyish with dark edges, and the dorsal has two rows of dark spots; the caudal also has black spots and a black edge. In still younger specimens the back and upper half of the body have many black spots, and the young are as a rule vertically banded.

Hab. Seas of India to the Malay Archipelago and China, attaining at least 5 feet in length; ascending tidal rivers and estuaries, and found in the Hooghly as high as Calcutta.

872. (10.) Sciæna aneus.

Johnius aneus, *Bloch, Ich.* t. 357.
Sciæna aneus, *Day, Fish. India,* p. 189, pl. xlv, fig. 5 (see synon.).

Pennah, Tam.; *Chal-burn-dah,* Andam.

D.10 | 1/23–24. P.18. A.2/7. L.r.56/50/50. L.tr.8–9/18. C.p.10.

Length of head $3\frac{2}{3}$ to 4, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{4}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Greatest width of head equals $\frac{4}{7}$ of its length. Interorbital space nearly flat, snout not overhanging the mouth, the lower jaw the longer. Cleft of mouth oblique; distance between eye and upper edge of maxilla $\frac{1}{2}$ to $\frac{3}{4}$ diameter of orbit. Nostrils large and opposite upper third of orbit. Preopercle finely but widely serrated along both limbs, its lower edge very strongly serrated in the young; two opercular spines. Shoulder-flap entire. A small pore on either side of snout just above free edge of skin. A small open pore on either side of symphysis of lower jaw on its under surface. *Teeth*—in the lower jaw an internal row, distantly placed and conical. *Fins*—dorsal spines of moderate strength, the second to the fifth the longest, one third higher than the rays, and from $\frac{1}{2}$ to $\frac{3}{7}$ the height of the body. Second anal spine weak, from $\frac{3}{4}$ to 1 diameter of the orbit in length, length of base of fin from $\frac{1}{4}$ to $\frac{4}{17}$ of that of soft dorsal. Caudal slightly rounded, cut square, or even a little emarginate. *Scales*—cycloid except in posterior portion of body, where they are feebly ctenoid. *Lateral line*—tubes become arborescent posteriorly. *Air-bladder*—oval, with about 30 lateral processes on either side, and extending the whole length of the abdomen. *Colour*—silvery grey, becoming dull white along the abdomen; first dorsal black-tipped or stained with dark grey; second dorsal greyish, lightest along its centre. Pectoral, ventral, and anal yellowish. Caudal tipped with grey.

Hab. Seas of India to the Malay Archipelago; very common at Madras up to 8 or 9 inches in length; not rare at Bombay and at the Andamans.

873. (11.) Sciæna maculata.

Johnius maculatus, *Bl. Schn. Syst. Ich.* p. 75.
Sciæna maculata, *Günther, Catal.* ii, p. 291; *Day, Fish. India,* p. 190 (see synon.).

Cooroowa and *Vari katchelee,* Tam.; *Cutlah,* Mal.; *Taan-tah,* Baluchi.

D. 10 | 1/23–24. A. 2/7. L.r. 65/45–48/58. L. tr. 8/16. Cæc. pyl. 8.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{4}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Width of head equals $\frac{1}{2}$ its length. Upper jaw overlapping the lower, and being itself overhung by the snout. Preopercle with rather strong denticulations at its angle, and its lower border crenulated in the young; opercle with two rather obtuse spines. Shoulder-flap serrated. A transverse row

of four pores across the snout, the free edge of the skin with five orifices and a lateral lobe. A central pore below the mandibular symphysis, having two more on either side of it. *Teeth*—in the lower jaw villiform in several rows above the symphysis, whilst laterally the inner row consists of curved, enlarged teeth, and the outer villiform ones soon disappear. *Fins*—dorsal spines of moderate strength, the third to the seventh longest, equal to half the height of the body and one third higher than the second dorsal fin. Outer ventral ray prolonged. Second anal spine $\frac{2}{3}$ as long as first ray, and about $\frac{1}{3}$ height of body, length of base of fin $\frac{1}{4}$ of that of soft dorsal. Caudal wedge-shaped in the young, becoming more obtuse in the adult. *Scales*—ctenoid, except on the cheeks. *Lateral line*—the tubes have usually a single branch on either side. *Air-bladder*—with 14 or 15 lateral processes on either side, each having two or three insertions. *Colour*—silvery grey, abdomen whitish, cheeks tinged with golden. Five broad black bands, sometimes interrupted, extend over the back: the first from the nape passes backwards and downwards, and shortly after crossing the lateral line abruptly terminates; the second passes backwards and downwards from between the fifth and seventh dorsal spines and terminates opposite middle of ventral fin; the third arises opposite the second and third dorsal rays or between the two dorsal fins; the fourth below centre of second dorsal, the fifth below last few dorsal rays; occasionally there is a sixth over the free portion of the tail. Upper two thirds of first dorsal stained black, becoming more indistinct with age; caudal slightly tinged with black, the other fins yellowish.

Hab. Seas of India, attaining at least a foot in length; not considered good eating.

874. (12.) Sciæna belangeri.

Corvina belengerii, *Cuv. & Val. H. N. Poiss.* v, p. 120.
Sciæna belengeri, *Day, Fish. India*, p. 191, pl. xliv, fig. 5 (see synon.).

Tooroo katchelee, Tam.

D.9 | 1/27-32. P.17. A.2/7. L.r.55/52/45-50. L.tr. 6/14. C.p.5.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, nearly 1 diam. from end of snout, and 1 apart. Width of head from $\frac{2}{3}$ to $\frac{3}{5}$ its length. Snout rounded, overhanging the upper jaw, which is in advance of the lower. Cleft of mouth almost horizontal. Preopercle serrated, most coarsely so at its angle and along its horizontal limb; two opercular spines. Distance between eye and upper edge of maxilla equals 1 diameter of orbit. Snout with three open pores across its base; the free edge of the skin has one central pore and one on either side dividing it into four lobes; five rather small open pores on the lower jaw. *Fins*—dorsal fin having as a rule only 9 spines, the first of which is very short; the second and third from $\frac{2}{3}$ to $\frac{1}{2}$ the height of the body, and $\frac{1}{3}$ higher

than the rays. Outer ventral ray prolonged. Second anal spine from a little above $\frac{1}{2}$ to $\frac{2}{3}$ the height of the first ray, and from $\frac{4}{9}$ to $\frac{2}{5}$ of that of the body; length of base of fin equal to $\frac{1}{4}$ of that of soft dorsal. Caudal wedge-shaped. *Scales*—ctenoid except on snout and below the eyes, where they are cycloid; they form a thick covering for base of soft dorsal fin. *Lateral line*—at first indistinct; the tubes with one or two branches. *Air-bladder*—"each side has ten branching processes, shorter, however, and apparently placed at a greater distance from each other than in *J. dussumieri* (*S. coitor*). The three posterior pairs are much longer than the preceding, the eighth and ninth bipartite, the tenth pair is undivided, pointed." (*Cantor.*) *Colour*—dark grey; dorsals, anal, and caudal almost black; a dark blotch on the opercle; some specimens are much lighter.

Hab. Seas of India to the Malay Archipelago and beyond; much more common on the Western coast of India than in the Bay of Bengal.

875. (13.) Sciæna semiluctuosa.

Corvina semiluctuosa, *Cuv. & Val. N. H. Poiss.* v, p. 97, pl. 106.
Sciæna semiluctuosa, *Day, Fish. India*, p. 191 (see synon.).

Sukkun, Baluchi.

D.10 | 1/28–31. A.2/7. L.r.85/55–60/75. L.tr. 8–9/25. C. p. 7–8.

Length of head $3\frac{1}{2}$ to 4, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 6 in length of head, 1 to 2 diam. from end of snout, and 1 to $1\frac{1}{2}$ apart. Greatest width of head equals $\frac{4}{7}$ of its length. Upper profile of head rather convex; snout a little inflated. Upper jaw rather longer than the lower. Edge of preopercle crenulated; two blunt opercular points. Three open pores across base of snout, five more along free margin of skin, and a small lateral lobe. Five pores under symphysis of lower jaw. *Teeth*—a few outer enlarged ones above symphysis of mandibles. *Fins*—dorsal spines weak, the third the longest, being $\frac{1}{3}$ higher than the rays and equal to $\frac{3}{7}$ of the height of the body. First ventral ray prolonged. Second anal spine strong, nearly $\frac{3}{4}$ as high as first ray and $\frac{3}{7}$ height of body, length of base of anal $\frac{2}{9}$ of that of soft dorsal. Caudal wedge-shaped or rounded. *Air-bladder*—simple. *Cæcal appendages*—longest equals about 3 diameters of orbit. *Scales*—ctenoid except on the snout and below the eyes; the base of the soft dorsal fin thickly scaled. *Lateral line*—tubes have short branches. *Colour*—deep grey with a blackish band running along the centre of each row of scales; head glossed with purple; fins deep black. In young specimens the lines along the rows of scales are very faint.

Hab. Seas of India to China, very common at Bombay and along the coasts of Sind and Baluchistan. I have never obtained this species in the Bay of Bengal; the largest specimen I met with was 18 inches in length.

876. (14.) Sciæna glauca.

Sciæna glaucus, *Day, Fish. India*, p. 192, pl. xlvi, fig. 2 (see synon.).

D. 10 | 1/28–30. P. 16. A. 2/7. C. 17. L. r. 52/50/52. L. tr. 6–18.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to $4\frac{1}{4}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Greatest width of head equals half its length. snout rounded and slightly overhanging the jaws, the upper of which overlaps the lower. Distance between eye and upper jaw equals $\frac{3}{4}$ diameter of orbit. Preopercle with distinct and widely separated denticulations most developed at angle; opercle with two spines. Shoulder-flap entire. Snout with three pores across its base and five along its free border, which has a distinct lateral lobe. Five open pores below symphysis of lower jaw. *Fins*—dorsal spines moderately strong, the highest $\frac{3}{5}$ the height of the body and nearly twice as high as the rays. Pectoral falciform, outer ventral ray prolonged. Second anal spine rather strong, from $\frac{1}{2}$ to $\frac{2}{3}$ as high as first ray and $\frac{4}{9}$ to $\frac{2}{5}$ the height of the body, base of anal equals $\frac{2}{9}$ of that of soft dorsal. Caudal rounded or wedge-shaped. *Scales*—cycloid on snout, cheeks, and anterior portion of the chest, ctenoid from behind preopercle and on upper surface of head from above middle of eye. *Lateral line*—tubes with one or two branches on either side. *Colour*—greyish green along the back, becoming silvery below, a diffused bluish blotch on the opercles; a dark spot at base of pectoral, most distinct posteriorly, everywhere fine brown spots. First dorsal nearly black; upper two thirds of second dorsal dark, due to fine spots, caudal and last half of pectoral greyish from the same cause.

Hab. Seas of India; very common at Bombay, where it attains a large size. Its air-bladder is similar to that of *S. sina*, is collected at the same places, and the two species have the same native names.

877. (15.) Sciæna carutta.

Johnius carutta, *Bloch, Ich.* t. 356.
Sciæna carutta, *Day, Fish. India*, p. 192, pl. xliv, fig. 1 (see synon.).

D. 10 | 1/25–28. P. 17. A. 2/7. C. 17. L. r. 65/50/55. L. tr. 5–6/18.

Length of head 4 to $4\frac{1}{3}$, height of body 4 in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Greatest width of head equals $\frac{2}{3}$ of its length. Snout inflated, overhanging the upper jaw, which slightly overlaps the lower; distance between eye and upper edge of maxilla equals diameter of orbit; cleft of mouth nearly horizontal. Preopercle crenulated, more especially along its lower border; opercle with two weak spines. A row of pores across the snout; 5 along edge of free border, and a lateral lobe. A central pore beneath symphysis of mandible having two more on either side of it. *Fins*—dorsal spines weak, second and third the longest, $\frac{1}{3}$ higher than

rays and $\frac{1}{2}$ the height of body; outer ventral ray elongate. Second anal spine weak, nearly $\frac{2}{3}$ as high as first ray, and $\frac{2}{7}$ to $\frac{2}{5}$ length of head. Caudal rhomboidal. *Scales*—mostly cycloid, a few between pectoral fin and lateral line ctenoid at the middle of their free edge. *Lateral line*—tubes with short branches. *Air-bladder*—with several lateral branching attachments. *Colour*—purplish brown from the presence of numerous fine dots, but becoming golden in lower fourth of body; lateral line generally lighter than contiguous parts. Head glossed with purple. First dorsal fin dark, the others with grey edges.

Hab. Seas of India to the Malay Archipelago; attaining nearly a foot in length.

878. (16.) Sciæna ossea.

Sciæna osseus, *Day, Fish. India*, p. 193, pl. xlvi, fig. 3.

D. 10 | 1/25. P. 18. A. 2/7. C. 17. L. r. 55/50/45. L. tr. 6/15.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 in the length of head, $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. The greatest width of the head equals its postorbital length. Snout obtuse, not inflated, the dorsal profile above the eyes a little concave; cleft of mouth oblique, anterior extremity of lower jaw on a level with lower edge of eye; the upper jaw scarcely overlaps the lower. Distance from eye to upper jaw nearly equals 1 diameter of orbit. Preopercle rather strongly denticulated in its whole extent. Two opercular spines. Shoulder-flap serrated. Three small pores across snout, and five along free edge of skin, but no lateral lobe. Two small central pores below symphysis of lower jaw, and two more large ones laterally and posteriorly. *Fins*—first dorsal spine very short, second and third equal, fourth longest, but only slightly higher than the posterior rays and $\frac{4}{9}$ the height of the body. Second anal spine weak, about half as long as first ray and equal to $\frac{1}{4}$ length of head. Caudal wedge-shaped. *Scales*—cycloid on head and chest, ctenoid on the body. *Lateral line*—forms a well-marked curve to above the front edge of the anal fin; tubes very distinct, and giving off one short branch on either side. *Colour*—brownish grey or stone-coloured along the back, becoming dull white on the sides and below. Opercle bluish black. First dorsal black in its upper half; outer edges of pectoral, ventral, anal, and caudal grey.

Hab. Malabar coast of India, whence a specimen 7 inches long was procured.

3. Genus **SCIÆNOIDES**, Blyth.

Syn. *Bola*, pt., Ham. Buch.; *Sciæna*, sp., Cuv. & Val.; *Collichthys*, Günther; *Hemisciæna*, Bleeker; *Plagioscion*, Gill.

Pseudobranchiæ present. Eyes small. Head broad, with its upper surface very convex. Cleft of mouth oblique and deep.

Teeth villiform in the upper jaw, an outer distantly placed row, curved and conical in the premaxillaries, becoming canine-like anteriorly; an inner row enlarged and conical in the lower jaw, with an outer villiform series. No barbels. Two dorsal fins united at their bases, the second with many rays; two weak anal spines; caudal wedge-shaped and pointed. Scales small, cycloid or ctenoid. Air-bladder generally having a horn-like process on either side, and with many lateral appendages. Pyloric appendages few or in moderate numbers.

Hab. Seas of India to the Malay Archipelago and beyond.

Synopsis of Indian Species.

D. 10 | 1/40–43. L. tr. 9/25 .... 1. *S. pama*, p. 124.
D. 8–9 | 1/34–37. L. tr. 11/20 .... 2. *S. microdon*, p. 125
D. 9 | 1/27–33. L. tr. 12/25 .... 3. *S. biauritus*, p. 125.
D. 9 | 1/27–28. L. tr. 21/34 .... 4. *S. brunneus*, p. 126.

879. (1.) Sciænoides pama.

Bola pama, *Ham. Buch. Fish. Ganges*, pp. 79, 368, pl. xxxii, fig. 26.
Sciænoides pama, *Day, Fish. India*, p. 193 (see synon.).

Ven begti, Ooriah and Hind.; *Coii bola*, Bengali; *Botul*, Ooriah; *Nga-pouss-was*, Mugh.; *Sabayó-shey*, Arracan; *Nga-byé-kon*, Burmese.

D. 10 | 1/40–43. A. 2/7. L. r. 90/55/85. L. tr. 9/25. Cæc. pyl. 9.

Length of head $4\frac{1}{3}$ to $4\frac{2}{3}$, height of body 5 to 6 in the total length. *Eyes*—diameter 7 to 8 in length of head, 2 diam. from end of snout, and $2\frac{1}{2}$ to 3 apart. Greatest width of head equals $\frac{4}{7}$ of its length. Snout not much swollen; lower jaw slightly the shorter; distance between eye and maxilla about $1\frac{1}{2}$ diameters of orbit. Preopercle crenulated, with denticulations at its angle; opercle with two points. Snout with two open pores on its anterior surface, and two more opening on the free edge of the skin; lower jaw with a small open pore a little below and to one side of the symphysis. Shoulder-flap edged with numerous long ciliæ. *Fins*—dorsal spines weak, with filamentous terminations, the 3rd and 4th longest, $\frac{4}{9}$ the height of body, and nearly twice as long as the rays. Pectoral pointed and as long as the head. Ventral reaches halfway to the vent. Second anal spine weak, $\frac{1}{3}$ to $\frac{2}{7}$ length of rays, and equal to 1 diameter of orbit; length of base of the fin equal to $\frac{1}{8}$ of that of soft dorsal. Caudal wedge-shaped, its central rays much the longest. *Scales*—cycloid on the head, ctenoid on the body. *Lateral line*—on a raised row of scales, becoming straight above the middle of the anal fin, its tubes very arborescent posteriorly. *Air-bladder*—dividing anteriorly into two short processes, whilst springing from near its posterior extremity are two more long processes which extend forward as far as the auditory apparatus. *Colour*—light brownish along the back, becoming

white beneath; head shot with gold and purple. Fins yellowish, upper half of dorsal grey, as is also the last half of the caudal.

Hab. Bay of Bengal, entering estuaries and rivers as far as the tide extends. This species attains at least 5 feet in length.

It is termed "*whiting*" in Calcutta, and is light and wholesome if cooked whilst fresh, but it rapidly becomes soft and tasteless after death.

880. (2.) Sciænoides microdon.

Otolithus microdon, *Bleeker, Batavia Nat. Tijdsch.* i, p. 99.
Sciænoides microdon, *Day, Fish. India,* p. 194, pl. xlv, fig. 2 (see synon.).

D. 8–9 | 1/34–37. A. 2/7. C. 18. L.r.95/85. L.tr.11/20. Cæc.pyl.6.

Length of head 4, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 6 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $2\frac{1}{4}$ apart. Greatest width of head equals $\frac{1}{2}$ to $\frac{2}{3}$ its length. Snout not overhanging the jaws, the lower slightly prominent opposite the symphysis. Edges of preopercle finely serrated; an opercular spine. Three open pores along free edge of skin at snout, but no lateral lobe. Four large open pores along underside of lower jaw near symphysis. *Fins*—dorsal spines 3rd to 5th longest, $\frac{1}{4}$ higher than rays and $\frac{1}{2}$ height of body. Pectoral equals the length of the head excluding the snout. Ventral reaches halfway to the anal. Second anal spine equals half height of rays. Caudal wedge-shaped. *Scales*—cycloid in the young, ctenoid on the body in larger specimens, especially below the lateral line. *Lateral line*—curves to opposite the commencement of the anal fin. *Colour*—brown, becoming lighter on the sides and beneath. Fins yellow, dorsal and anal tipped with blackish.

Hab. Orissa to the Malay Archipelago.

881. (3.) Sciænoides biauritus.

Otolithus biauritus, *Cantor, J. A. S. B.* xviii, p. 1039; *Catal.* p. 57.
Sciænoides biauritus, *Day, Fish. India,* p. 194, pl. xlvii, fig. 1 (see synon.).

D. 9 | 1/27–33. P. 19. A. 2/7. L. r. 115/95. L. tr. 12/25. C. p. 13.

Length of head 4 to $4\frac{1}{3}$, height of body 5 to 6 in the total length. *Eyes*—diameter 7 to 8 in length of head, 2 diam. from end of snout and also apart. Greatest width of head equals half its length. Upper jaw overlaps the lower. Distance from eye to upper jaw equals diameter of orbit. Posterior margin of preopercle oblique, indistinctly crenulated; two opercular points. Five open pores along free edge of skin of snout, no lateral lobe; four small open pores on under surface of lower jaw. Shoulder-flap fimbriated. *Fins*—dorsal spines weak, and as high as the posterior rays of the soft dorsal fin, the highest about $\frac{2}{5}$ height of body. Pectoral equals head behind middle of eyes. Ventral reaches halfway to anal.

Second anal spine weak, half as long as the rays and $\frac{1}{4}$ the length of the head; base of anal fin from $\frac{2}{11}$ to $\frac{1}{6}$ as long as that of soft dorsal. Caudal wedge-shaped. *Scales*—cycloid, except on the body below the lateral line, where they are feebly ctenoid. *Lateral line*—on a row of thin scales, becoming straight above the front edge of the anal fin; tubes well developed. *Air-bladder*—with 25 lateral processes, and a single long projection on either side from the anterior extremity reaching to the posterior end. *Colour*—light brownish above, tinged with gold on the abdomen, head shot with purple.

Hab. Seas and estuaries of India to the Malay Archipelago and China. The longest specimen in the Calcutta Museum measures 42 inches.

882. (4.) Sciænoides brunneus. (Fig. 50.)

Otolithus brunneus, *Day, Jour. L. S.* xi, 1873, p. 524.
Sciænoides brunneus, *Day, Fish. India,* p. 195, pl. xlv, fig. 6 (see synon.).

D. 9 | 1/27–28. P. 18. A. 2/7. L. r. 130/102/130. L. tr. 21/34.

Length of head 4 to $4\frac{1}{2}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter 7 to 8 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Width of head equals half its length. Jaws about equal, or lower slightly shorter. Preopercle with a few widely separated serrations, most apparent at its rounded angle. Opercle with two obtuse points. No open glands on snout; two badly marked pores on front of lower jaw below symphysis. Shoulder-lobe fimbriated along its free edge. *Teeth*—a small curved canine on either side of middle of each jaw, otherwise

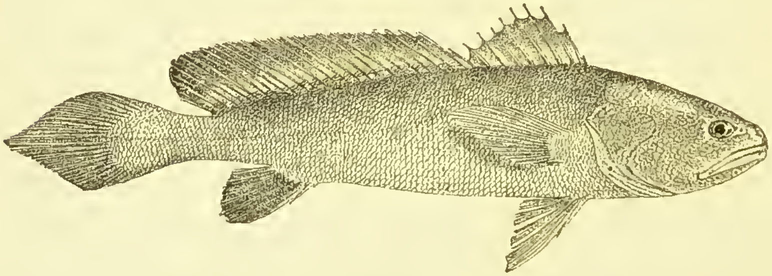

Fig. 50.—*Sciænoides brunneus.*

as in the other species of the genus. *Fins*—dorsal spines weak and having filamentous terminations, 3rd to 6th of somewhat the same length, longest, and about $\frac{4}{9}$ height of body. Second dorsal highest in last third, where it equals or exceeds spinous dorsal. Pectoral as long as the head behind middle of eye; ventral only reaches one third of distance to vent. Anal spines weak and short, $\frac{1}{3}$ of length of rays, length of base of fin $\frac{2}{11}$ or $\frac{1}{6}$ of that of soft dorsal. Caudal pointed. *Scales*—rather oval, cycloid, and

transversely elongated on the head, ctenoid and vertically elongated on the body; a few very fine ones over bases of soft dorsal and anal fins. *Lateral line*—gently curves to below first fourth of second dorsal, where it becomes straight. *Colour*—brownish, becoming golden below; fins darkest externally.

Hab. Bombay, where it is common in October, attaining at least 18 inches in length.

4. Genus **OTOLITHUS**, Cuv.

Syn. *Cynoscion, Anomiolepis, Apseudobranchus, Archoscion,* and *Atractoscion,* Gill.

Pseudobranchiæ present. Body oblong. Eyes of moderate size. Snout a little pointed, the lower jaw the longer. Preoperele crenulated, serrated, or denticulated. No barbels. Villiform teeth in both jaws, with the outer row in premaxillaries enlarged; well-developed conical canines in both jaws or merely in the upper, they are usually received, when the mouth is closed, into fossæ in the opposite jaw. A single row of widely separated conical teeth in the lower jaw, with occasionally a single outer villiform row. Two dorsal fins united at their bases, the first with 9 or 10 weak spines; anal with one or two small ones, and few rays. Scales ctenoid or cycloid, of moderate or small size. Air-bladder present, mostly with lateral appendages. Pyloric appendages few.

Geographical Distribution. Most tropical seas: some are said to be found in fresh water; in India they are rarely, if ever, taken above tidal reach.

Uses. Employed as food; the air-vessels collected for isinglass.

Synopsis of Indian Species.

A. 2/10–11, L. tr. 14/26. Body spotted ...... 1. *O. maculatus*, p. 127.
A. 1–2/7, L. tr. 7/17. Brownish red shot with silver .... 2. *O. ruber*, p. 128.
A. 2/7, L. tr. 7–8/21. Silvery, dark longitudinal bands .... 3. *O. argenteus*, p. 129.

883. (1.) **Otolithus maculatus.** (Fig. 51.)

Otolithus maculatus (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* v, p. 64; *Day, Fish. India*, p. 196, pl. xlvi, fig. 4 (see synon.).

Birralli, Ooriah.

D. 9–10 | 1/30. P. 18. A. 2/10–11. C. 17. L. r. 95/85. L. tr. 14/26.

Length of head $3\frac{1}{2}$ to $4\frac{1}{4}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter 6 to 7 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Greatest width of head equals $\frac{4}{7}$ to $\frac{1}{2}$ its length. Edge of preoperele crenulated rather than denticulated (spiny in the young); opercle with two weak points. Skin of snout with three small open orifices along its free border, but no lateral lobe. No open pores visible below lower jaw. Shoulder-

flap crenulated. *Teeth*—a long strong canine on either side of the symphysis of the lower jaw, and also on either side of the upper just external to those in the mandibles. *Fins*—dorsal spines weak, with filamentous terminations; they increase in length to about the fifth, which equals $\frac{2}{3}$ height of body and is a third higher than the rays. Ventral reaches about $\frac{1}{3}$ of distance to anal. Second anal spine weak, $\frac{1}{2}$ the height of first ray, and $\frac{1}{4}$ of that of body; length of base of anal fin equals $\frac{1}{3}$ of that of soft dorsal. Caudal wedge-shaped or rounded. *Scales*—cycloid, and in very irregular rows. *Air-bladder*—with about 54 lateral appendages on either side. *Colour*—greyish in the upper part of the body, golden below;

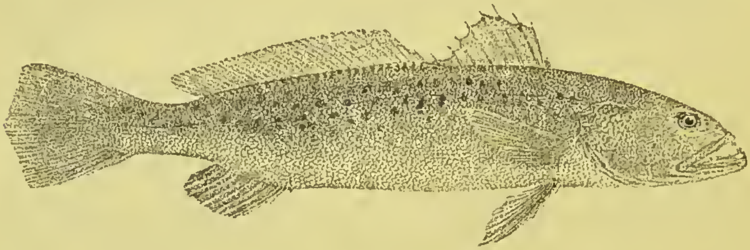

Fig. 51.—*Otolithus maculatus.*

five or six rows of black spots along the body and caudal fin; the other fins stained with grey at their edges.

Hab. Seas of India to the Malay Archipelago; attaining at least 16 inches in length; very common in the sea and estuaries of Orissa and Lower Bengal.

884. (2.) Otolithus ruber.

Johnius ruber, *Bl. Schn. Syst. Ich.* p. 75, t. xvii.
Otolithus ruber, *Day, Fish. India,* p. 196 (see synon.).

Nga pootheng, Arracan; *Popa,* Chittagong.

D.10 | 1/29–31. A.1–2/7. L.r. 60–65/52–54/54. L.tr.7/17. C. p.4–5.

Length of head $3\frac{1}{2}$ to 4, height of body 4 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 or even 6 in length of head, nearly 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Greatest width of head equals $\frac{4}{9}$ of its length. Preopercle scarcely denticulated; two opercular spines. Shoulder-flap entire. Distance between eye and upper jaw is $\frac{2}{3}$ diameter of eye. *Teeth*—on either side of the symphysis of the upper jaw a pair of large canines, an inner villiform band, and a row of outer teeth conically curved occasionally even between the canines; in the lower jaw a central (sometimes a second) curved canine with a few villiform teeth behind it, and a lateral row of distantly placed conical teeth. *Fins*—dorsal spines slender, second and third $\frac{1}{2}$ to $\frac{4}{9}$ the height of body, and from $\frac{1}{2}$ to $\frac{2}{3}$ higher than the rays. The ventral does not reach quite halfway to the vent. First anal spine minute or wanting, the length of the second about $\frac{2}{5}$ of the first ray, base of anal fin about $\frac{1}{6}$ of soft dorsal.

Caudal wedge-shaped. *Scales*—cycloid. *Lateral line*—the tubes arborescent posteriorly. *Air-bladder*—somewhat contracted at its first fourth and having about 34 branching processes on either side. *Colour*—brownish red, shot with silvery and white, sometimes glossed with gold in lower third of body. First dorsal stained black at its edge, soft dorsal and anal with greyish outer margins; pectoral, ventral, and anal yellow.

Hab. Seas of India to the Malay Archipelago, attaining $2\frac{1}{2}$ feet or more in length; this is the commonest form in the Indian seas, especially along the Coromandel coast. It is pretty good for the table. The ova appear to be deposited from about March to July.

885. (3.) Otolithus argenteus.

Otolithus argenteus (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* v, p. 62 (from a figure); *Day, Fish. India*, p. 197, pl. xlv, fig. 3.

Dátarya dhomá, Maráthi; *Bu-ru*, Sind.; *Golaree*, Tel. (at Gopalpore).

D. 10 | 1/28–30. A. 2/7. L. r. 70–80/54/70–75. L. tr. 7–8/21. C. p. 6.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{8}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Greatest width of head equals from $\frac{4}{7}$ to $\frac{1}{2}$ its length. Interorbital space almost flat. Distance between eye and maxilla equals $\frac{1}{2}$ diameter of orbit. Vertical limb of preopercle slightly serrated (in the young it is spiny); its angle and lower edge crenulated; two opercular spines. Free edge of skin across snout entire, having an open pore above the canine teeth; no open glands on lower jaw. Edge of shoulder-flap serrated. *Teeth*—two large pointed canines at the side of the symphysis in the upper jaw. A single large central canine in the lower jaw and a lateral row of conical teeth; in some specimens there exist a few villiform teeth external to this row. *Fins*—dorsal spines increase in length to third and fourth, which equal $\frac{1}{2}$ height of body, and are $\frac{1}{3}$ higher than the rays. Ventral reaches halfway to the anal. Second anal spine weak, rather more than $\frac{1}{3}$ height of first ray, and $\frac{3}{4}$ diameter of orbit; base of anal equals $\frac{1}{5}$ of that of soft dorsal. Caudal wedge-shaped. *Scales*—cycloid, except below the lateral line in the last half of the body, where they are more or less ctenoid; some over bases of caudal and anal fins. *Lateral line*—tubes strongly arborescent posteriorly. *Air-bladder*—with 25 lateral processes on either side. *Colour*—silvery, darkest along the back; four dark longitudinal bands along sides, one along lower edge of dorsal fin, a second at $\frac{1}{3}$ the distance between it and the lateral line, the two others on either side of the lateral line. A darkish spot on the opercle. Pectoral, ventral, and anal orange, outer edge of dorsal greyish.

Hab. *O. argenteus* inhabits the seas of India to the Malay Archipelago and China; attaining upwards of $2\frac{1}{2}$ feet in length.

Family XIV. XIPHIIDÆ.

Sword-fish.

Branchiostegals seven; pseudobranchiæ. Eyes lateral. Body compressed, the upper jaw (comprising ethmoid, vomer, and premaxillaries) produced into a long, sword-shaped process; cleft of mouth deep. Teeth absent or rudimentary. One or two dorsal fins, without any distinct spinous portion; ventrals, when present, thoracic and rudimentary. Scales absent or in the form of rudimentary dermal productions. Air-bladder present. Pyloric appendages, when present, numerous.

Sword-fishes are well known to occasionally attack vessels in the Indian Ocean. Instances of the sides of vessels in the Bay of Bengal having been perforated by the snouts of these fishes are recorded in the Journal of the Asiatic Society of Bengal (ii, p. 647, and iv, p. 411). A case was described in the Indian 'Daily News' (November 1874), in which the snout of a sword-fish had pierced both the copper and the timbers of a ship's side on the voyage between Bombay and Calcutta. See also a paper by Dr. J. E. Gray (A. M. N. H. 1871, viii, pp. 338, 339), "On the injury inflicted on ships by the Broad-finned Sword-fish of the Indian Ocean."

The very young of *Xiphias* has a long *Belone*-like beak; the supraorbital edge bears conical prominences, there is no occipital spine, and two short pointed teeth project at the angle of the preopercle. The young of *Histiophorus* has the jaws comparatively shorter, the supraorbital edge very finely or not denticulated, a bony spine on each side of the occiput and at the angle of the preopercle. The genus *Xiphias*, which has no ventral fins, has not been found in the seas of India.

Geographical Distribution. Tropical and subtropical seas.

1. Genus **HISTIOPHORUS**, Lacép.

Syn. *Notistium*, Herm.; *Tetrapturus* (Rafin.), Cuv. & Val.; *Zanclurus*, Swains.

Body elongate. Upper jaw conical, much prolonged, and considerably longer than the lower. Minute teeth on the jaws and palatines; vomer edentulous. Two dorsal and two anal fins, the anterior of each of which is the longer; ventrals in the form of one, two, or three rays.

The height of the dorsal fin, in comparison with that of the body, appears to be much more considerable in the young than in the adult.

Col. N. Pike, in the 'Transactions of the Royal Society of Arts and Sciences of Mauritius,' vii, 1873, p. 32, remarks as follows:— "This fish is a beautiful sight in the water. It has a habit of

lying sunning itself on the surface when undisturbed, its dorsal fin fully expanded and acting as a sail (and when needed it can propel itself at great speed), but it is only in the calmest weather it can be thus seen. It is frequently caught in deep water with hook and line, and when near the surface it is speared. I am informed by the Hon. Mr. Ward, who has had considerable experience with this fish, that at times it is difficult and even dangerous to capture; as when hooked or speared it makes for the boat and gives plenty of sport, taking tremendous leaps into the air, and if care is not taken it will leap into the boat, to the great consternation of the fishermen."

Synopsis of Indian Species.

Dorsal fin much higher than body and covered with brilliant blue spots......	1. *H. gladius*, p. 131.
Dorsal fin much higher than body. Grey, dorsal blackish	2. *H. immaculatus*, p. 132.
Dorsal fin not so high as body. Grey, dorsal and pectoral tipped with black	3. *H. brevirostris*, p. 132.

886. (1.) Histiophorus gladius.

Scomber gladius, *Bloch, Ich.* t. 345.
Histiophorus gladius, *Day, Fish. India*, p. 198 (see synon.).
Tadmása, Maráthi; *Myl-meen*, Tam. 'Peacock Fish.'

D. 40–50/7. P. 15. V. 1–2. A. 10/7. C. 17. Vert. 14/10.

Length of entire head 4, height of body 7 to 8 in the total length. A very abrupt ascent in upper profile of head. Snout produced and longer than remainder of head. *Fins*—dorsal fin commences on the nape and is much higher than the body (sometimes twice as high) in its first portion, but becomes lower posteriorly, and considerably raised above its middle in young specimens. Pectoral equal to $\frac{1}{6}$ or $\frac{1}{7}$ of the total length. First anal commences under last fourth of first dorsal; second anal, smaller, is below the second dorsal and similar to it. *Scales*—dermal productions lanceolate. Stomach elongate, intestines very short, not exceeding the length of the fish. *Air-bladder*—in the last third of the abdominal cavity, consisting of two distinct lateral portions, each of which is subdivided internally into numerous cavities. *Cæcal appendages*—absent (Ehrenberg found them innumerable). *Colour*—body bluish grey, becoming dull white underneath. Dorsal fin of a bright Prussian-blue with darker spots; other fins dusky.

Hab. Tropical seas or their vicinity. I procured one 9 feet long at Madras, February 15, 1867; its stomach contained a full-sized *Scomber microlepidotus*, two large *Hemiramphi*, and numerous small fish. Common in the cold season off Madras, arriving about October and continuing until March.

887. (2.) Histiophorus immaculatus.

Histiophorus immaculatus, *Rüpp. P. Z. S.* 1835, p. 187; *Day, Fish. India*, p. 199 (see synon.).

Yemungolah, Tamil.

D. 47/7. P. 16. V. 3. A. 10–11/7. C. 17.

Length of head (including the snout) 3, height of body 10 in the total length. *Eyes*—diameter about 3 in postorbital portion of head. A very slight ascent from the snout to the base of the first dorsal fin. *Fins*—length of base of dorsal fin about $\frac{1}{3}$ of total length, eleventh to fifteenth dorsal rays the longest, and at least three times higher than the body; the last few rays are low and reach to base of second dorsal fin. Ventral elongate. *Scales*—dermal productions lanceolate. *Lateral line*—at first makes a very strong curve, but becomes straight above the hind extremity of the pectoral fin. *Colour*—grey, dorsal and ventral blackish.

Hab. Red Sea and seas of India. A specimen in the Madras Museum was 5 feet 9 inches in length.

888. (3.) Histiophorus brevirostris. (Fig. 52.)

Histiophorus brevirostris, *Playfair, Fish. Zanz.* pp. 53, 145, c. fig.; *Day, Fish. India*, p. 199, pl. xlvii, fig. 3 (see synon.).

D. 35/7. P. 19. V. 2. A. 11/7. C. 17.

Length of head (including the snout) $3\frac{1}{3}$, of caudal lobes 5, entire length of upper jaw (including the snout) $4\frac{1}{2}$, height of body 8 in the total length. Greatest width of head equals $\frac{1}{2}$ its depth. *Eyes*—diameter 3 in postorbital portion of the head. A very slight ascent from the snout to the base of the first dorsal fin. Snout produced, its length, beyond the anterior extremity of the lower jaw, rather above $\frac{1}{3}$ of that of the head. *Fins*—first dorsal highest anteriorly, where it nearly equals the body in height, posterior rays from about the fifth not quite $\frac{1}{3}$ the height of the

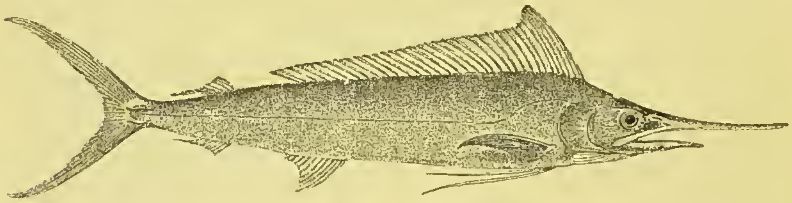

Fig. 52.—*Histiophorus brevirostris.*

anterior; second dorsal with its last ray prolonged. Pectoral as long as the head behind the front nostril. Ventral reaches above halfway to anal and equals about $\frac{1}{6}$ of entire length of fish. First anal fin commences under about the 25th dorsal ray, it is highest anteriorly, where it equals $\frac{4}{5}$ of the body above it, its lower edge is

very concave; second anal below the second dorsal but rather shorter, its last ray prolonged. Caudal deeply forked. *Scales*—dermal productions lanceolate. *Lateral line*—forms rather a strong curve to above the middle of the pectoral fin, where it becomes straight; two keels on either side of the free portion of the tail, the upper being more developed than the lower. *Colour*—greyish superiorly, becoming dull beneath, tip of first dorsal and end of pectoral edged with black.

Hab. (? East coast of Africa), seas of India, perhaps New Zealand. The largest specimen I saw in the Madras Museum was 4 feet 4 inches in length.

Family XV. TRICHIURIDÆ.

Trichiurinæ, Swainson.

Body elongate and compressed. Gill-openings wide. Eyes lateral. Cleft of mouth deep. Teeth in jaws or palate, several being strong and conical. Dorsal and anal fins many-rayed; finlets sometimes occur behind the dorsal or anal fins; ventrals, when present, thoracic, but sometimes rudimentary; caudal absent or present. Scales, when present, rudimentary. No prominent papilla behind the vent. Air-bladder present. Pyloric appendages few or many.

Uses. These fishes are held in various estimation in different places. In Baluchistan and where salt is cheap no one will touch them; but along the coasts of India they are more esteemed, mostly because being thin or ribbon-shaped they can be dried without salting. Russell observed that in his time they were esteemed by the European soldiers. Jerdon states that "they afford very delicate eating when fresh, though never brought to the table of Europeans."

Geographical Distribution. Tropical and subtropical seas.

1. Genus **TRICHIURUS**, Linn.

Syn. *Enchelyopus,* Klein; *Lepturus* (Art.), Gill, and *Eupleurogrammus,* Gill.

Nus-sah-ruc, Mugh; *Sawaryi,* Tel.

Branchiostegals seven; pseudobranchiæ. Body very elongate, ribbon-shaped, tapering to a finless point at the tail. Teeth in jaw and palatines, those in the premaxillaries arched and very strong, lateral teeth lancet-shaped. A single long dorsal fin extending the whole length of the back; ventrals, when present, in the form of a pair of scales; anal spines minute, sometimes concealed beneath the skin. Scales absent. Pyloric appendages numerous.

Geographical Distribution. Same as the family.

Synopsis of Indian Species.

D. 140–150. Highest dorsal rays ½ height of body	1. *T. muticus*, p. 134.
D. 127–133. Highest dorsal rays as high as body. Eyes from 1⅔ to 2⅓ diameters from end of snout	2. *T. haumela*, p. 134.
D. 112–120. Eyes 2¾ to 3½ diameters from end of snout	3. *T. savala*, p. 135.

889. (1.) Trichiurus muticus.

Trichiurus muticus, *Gray, Zool. Misc.* p. 10; *Day, Fish. India*, p. 200, pl. xlvii, fig. 5, *Suppl.* p. 788 (see synon.).

D. 140–150. P. 11.

Length of head 10½ to 11½, height of body 16 to 16½ in the total length. *Eyes*—diameter 6½ in length of head, 2 diam. from end of snout, and nearly 1 apart. The height of the head equals ½ its length. The lower jaw slightly produced beyond the upper; interorbital space with a keeled ridge along its centre. *Teeth*—about 20, sharp and compressed, on the side of the upper jaw, in front are two pairs of large, curved, and usually (but not invariably) slightly barbed fangs; there are two similar but much smaller ones above the symphysis of the lower jaw, and these are anterior to the snout when the mouth is closed; laterally there are about 15 or 16 teeth in the mandibles similar to those in the upper jaw, but smaller. *Fins*—dorsal commences above hind edge of preopercle, the first rays are short, their length being about equal to 1 diameter of the orbit, the longest rays are only about equal to ½ the height of the body; the rudimentary ones have been enumerated in the numbers given above. Pectoral ⅓ as long as the head. Ventrals indicated by two small rounded scale-like productions on the lower surface of the abdomen. Anal spine almost or entirely concealed in the skin. *Lateral line*—almost straight and a little below the middle of the body, especially in the last part of its course. *Colour*—burnished silver, fins yellowish.

Hab. Seas of India to China, very common in Orissa up to about 25 inches in length.

890. (2.) Trichiurus haumela.

Clupea haumela, *Forsk. Descr. Anim.* p. 72, no. 106.
Trichiurus haumela, *Day, Fish. India*, p. 201 (see synon.).

Puttiah, Ooriah; *Sawala*, Tel.; *Sona-ka-wahlah*, Tam.; *Pa-pa-dah*, Andam.

D. 127–133. P. 11.

Length of head 6½ to 8, height of body from 12 to 15 in the total length. *Eyes*—diameter 4¾ to 6½ in length of head, 1⅔ to 2⅓ diam. from end of snout, and ¾ apart; the height of the eye is at least

$\frac{1}{2}$ of that of the head at the orbit. Lower jaw considerably the longer. Dorsal profile, between end of snout and eye, rather concave. Height of head equals $\frac{2}{5}$ of its length. *Teeth*—upwards of 10 to 12, sharp and compressed in either side of upper jaw, usually increasing in size posteriorly, whilst anteriorly in the premaxillaries are two pairs of large curved and barbed canines, there are two similar but smaller teeth above the symphysis of the lower jaw (and in advance of the end of the snout when the mouth is closed), most distinct in the adult, and 8 lateral ones also of less size than those in the upper jaw, some of the latter are occasionally barbed. Teeth also in the palatines. *Fins*—the first few dorsal rays are of less height than those near the middle of the fin, which about equal height of body. Pectoral nearly or quite as long as the height of the head. Behind the anus the anal fin is seen in the form of short spines, often entirely concealed or else blunted at their extremities; in one specimen I count 74, in another 80. *Lateral line*—gradually descends until above the commencement of the anal fin, where it is in the lower third of the body. *Colour*—greyish along the back, becoming silvery on the sides and beneath; a dark mark along edge of preorbital. *Fins*—pale yellow, upper half of dorsal rendered dark by numerous fine black dots.

Hab. East coast of Africa, seas and estuaries of India, and the Malay Archipelago to China; attaining at least 3 feet in length. This fish is extremely voracious, devouring its own species, as well as other kinds of fish and crustacea. It is much more common than *T. savala*.

891. (3.) **Trichiurus savala.** (Fig. 53.)

Trichiurus savala, *Cuv. & Val. H. N. Poiss.* viii, p. 251, pl. 224; *Day, Fish. India*, pp. 201, pl. xlvii, fig. 4, *Suppl.* p. 788 (see synon.).

Toki vákati, Maráthi; *Nga thárooey,* Arracan; *Chooree muchee,* Chittagong; *Nga takôon kyá,* Burmese.

D. 112–120. P. 11.

Length of head $7\frac{1}{2}$, height of body 16 in the total length. *Eye*—diameter $6\frac{1}{2}$ to 7 in length of head, $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of snout, and 1 apart; height of eye about $\frac{1}{3}$ of that of the head at the orbit, height of head $2\frac{1}{2}$ to $2\frac{2}{3}$ in its length. The lower jaw considerably prolonged beyond the upper. Interorbital space nearly flat; dorsal profile between upper surface of eyes and end of snout

Fig. 53.—*Trichiurus savala.*

slightly concave. Distance from eye to upper jaw nearly equals diameter of orbit. *Teeth*—about 8, sharp and compressed, laterally

in the upper jaw, whilst in front are two or three pairs of large, curved, and barbed fangs; there are two similar and rather smaller ones above the symphysis of the lower jaw, and these are anterior to the snout when the mouth is closed; laterally there are about 9 similar to those in the upper jaw, but smaller. *Fins*—the dorsal fin commences over the hind edge of the preopercle; the first rays are short, being about equal to 1 diameter of the orbit, the longest rays are about equal to the height of the body. Pectoral $\frac{4}{11}$ of length of head. No rudiment of ventral fins. Anal in the form of about 76 to 82 free spines, which may be concealed in the skin but are generally distinct, especially the first, which is twice as long as in *T. haumela*. *Lateral line*—passes downwards to the lower third of the side. *Colour*—silvery, fins yellowish white.

Hab. Seas and estuaries of India, the Malay Archipelago, and China; attaining at least 16 inches in length.

Family XVI. ACANTHURIDÆ.

Acanthurinæ, pt., Swains.; *Acanthuroidei*, Bleeker; *Acronuridæ*, Günther.

Branchiostegals from four to seven; pseudobranchiæ. Body oblong or elevated and compressed. Eyes of moderate size and lateral. Cleft of mouth very slight. Teeth in both jaws in a single compressed row, often lobate or serrated, tapering incisors sometimes present. Palate edentulous. A single dorsal fin with fewer spines than rays; anal with two or three spines; ventrals thoracic. Scales minute. Lateral line complete and continuous. The side of the free portion of the tail usually armed with one or more bony plates or spines; these are small or absent in the immature, developing with age. Air-bladder present, forked posteriorly. Pyloric appendages few.

Geographical Distribution. Tropical seas.

Synopsis of Indian Genera.

An erectile spine on either side of free portion of tail; ventral usually with one spine and five rays .... 1. ACANTHURUS.

One to three non-erectile spines on either side of free portion of tail; ventral with one spine and three rays .... 2. NASEUS.

1. Genus ACANTHURUS (Forsk.), Bl.

Syn. *Opisotomus*, Comm.; *Harpurus*, Forster; *Acronurus*, Cuv. (young); *Keris*, pt., Cuv. (? young); *Ctenodon* and *Zabrasoma*, Swains.; *Scopas*, Kner; *Rhombotides*, Bleeker.

Kohli-meen, Tam.

Branchiostegals five; pseudobranchiæ well developed. Body and head elevated and strongly compressed. Eyes high up. Teeth

in a single row with lobate or serrated edges; anal with three spines; ventral usually with one spine and five rays. Scales small or minute, cycloid or ctenoid, sometimes spiny. A movable spine in a groove on side of free portion of tail, just below the lateral line. Air-vessel large. Pyloric appendages few (5–7).

The caudal fin generally becomes more lobed or emarginate in adults than it is in the young. In some instances (see *A. hepatus*, p. 143) the rays in the ventral fin are diminished in number and rather altered in character.

The young of this genus have no scales, but the skin is vertically striated, sometimes with small rough points. In a specimen of *Acanthurus melanurus* from Malabar, $1\frac{1}{2}$ inches in length, the most distinct appearance of scales is to be seen along the bases of the dorsal and anal fins. There are two parallel raised serrated ridges from the snout to opposite the nostril, whilst the anterior edge of the second spine of the dorsal fin is serrated. In a second specimen, although slightly smaller, little sharp points or rudimentary scales are to be seen, appearing as if each ridge of the skin were ctenoid in places. In a specimen $2\frac{1}{5}$ inches in length the serrations adverted to have disappeared and rudimentary scales are visible all over the body.

Geographical Distribution. All tropical seas except the Eastern Pacific.

Synopsis of Indian Species.

A. Broad teeth fixed in jaws; 8 or 9 dorsal spines.	
a. Ventral rays 5.	
Head and upper $\frac{2}{3}$ of body canary-yellow with oblique blue bands....	1. *A. lineatus*, p. 138.
Blue, head dark brown, chest white..	2. *A. leucosternum*, p. 138.
Bluish, with about 12 longitudinal yellow bands	3. *A. aurolineatus*, p. 139.
Greenish, with vertical black bands..	4. *A. triostegus*, p. 139.
Brown, caudal fin white-edged......	5. *A. tennentii*, p. 140.
Brown, dorsal and anal banded, a white ring at base of caudal......	6. *A. matoides*, p. 141.
Blackish brown; fins black. L. l. about 150................... ...	7. *A. gahm*, p. 141.
Brown, fins blackish brown. L. l. about 80	8. *A. celebicus*, p. 142.
Brown, a black band over occiput, another over free portion of tail. Silvery band from opercle to chest.	9. *A. melanurus*, p. 142.
b. Ventral rays 2....................	10. *A. hepatus*, p. 143.
B. Setiform movable teeth dilated at their extremities; 8 or 9 dorsal spines. V. 1/5	11. *A. strigosus*, p. 143.
C. Broad teeth fixed in jaws; 1 to 4 dorsal spines. V. 1/5.	
D. 5/24–25. Blackish, caudal yellow.	12. *A. xanthurus*, p. 144.
D. 3–4/28–29. Brown with narrow blue lines......................	13. *A. velifer*, p. 144.

892. (1.) Acanthurus lineatus.

Chætodon lineatus, *Gmelin, Syst. Nat.* i, p. 1246.
Acanthurus lineatus, *Day, Fish. India,* p. 203 (see synon.).

Seweyah, Ceylon.

D. 8–9/28–31. P. 15. V. 1/5. A. 3/27. C. 17.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, of caudal $3\frac{1}{3}$, height of body 3 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 3 to $3\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Profile from dorsal fin to snout obtuse. *Teeth*—six or seven lobate incisors on either side of the upper jaw. *Fins*—dorsal spines rather weak and a little shorter than the rays, interspinous membrane scarcely notched. Pectoral as long as or slightly longer than the head. Caudal lobed, upper lobe the longer. *Scales*—about 8 rows between lateral line and base of last dorsal spine. Lancet-shaped spine with a posterior process. Least depth of the free portion of the tail equal to $\frac{1}{2}$ the length of the head. *Colour*—head and upper two-thirds of body canary-yellow, traversed by nine or ten more or less oblique blue bands from the head to the back and caudal fin; lower third of body reddish grey. Two or three blue bands pass down the summit of the head and the anterior edge of the eye towards the snout; about seven more pass across the cheeks to the bands on the body. Other blue bands pass upwards and backwards from the hind edge of the eye to the bands on the body. Dorsal and anal fins dark with a grey margin. Pectoral having its upper ray blue, and just internal to it a white line ascending halfway up the ray; an arched white band on lower half of pectoral fin on its inferior side. Ventral with its outer ray blue, its inner ones red. Caudal with a semilunar blue band in its middle and a blue posterior edge.

Bennett observed of Ceylon examples that amongst six or seven specimens no two were alike in the arrangement of the blue and yellow streaks near the caudal fin.

Hab. Seas of India to the Malay Archipelago; common at the Andamans in December and January up to 10 inches in length.

893. (2.) Acanthurus leucosternum.

Acanthurus leucosternon, *Bennett, P. Z. S.* 1832, p. 183; *Day, Fish. India,* p. 203 (see synon.).

D. 9/29–30. P. 16. V. 1/5. A. 3/27–28. C. 17.

Length of head $4\frac{2}{3}$, of caudal $5\frac{1}{3}$, height of body about $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $2\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Profile from the upper edge of the eye to the snout rather concave. *Teeth*—five, truncated and lobate, on either side of upper jaw, and six in lower. *Fins*—last dorsal spine as high as the rays, and equal to about $\frac{4}{13}$ of height of body, posterior extremities of soft dorsal and anal fins rather angular. Pectoral as long as head. Anal as high as soft dorsal; caudal emarginate. *Scales*—very small, rough and rudimentary on

head and chest. Lancet-shaped spine with a posterior process. Least depth of free portion of the tail $\frac{4}{7}$ of length of head. *Colour*—blue, head dark brown or black, chest white, as is also a ring on lower part of mouth, ascending to its angle. A broad bluish band passes down the shoulder to the axilla, which last has a triangular brown patch. A narrow crescentic black band across base of caudal, continued along the upper and lower edges of the fin, a second wide one along the last fourth of the fin, and having a white outer border. Other fins stained grey at their edges.

Hab. East coast of Africa, Mauritius, Ceylon, to the Malay Archipelago; attaining to over 6 inches in length.

894. (3.) **Acanthurus àurolineatus.**

Acanthurus aurolineatus, *Day, Fish. India,* p. 204, pl. xlviii, fig. 3.

D. 9/26. P. 18. V. 1/5. A. 3/25. C. 17.

Length of head $4\frac{1}{4}$, of caudal $5\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—high up, diameter 3 in length of head, $1\frac{1}{3}$ diam. from end of snout, and 1 apart. Preopercle entire. Upper profile of head rather convex. *Teeth*—eight, lobate on either side in the upper, and eight or nine in the lower jaw. *Fins*—last dorsal spine $\frac{2}{5}$ of height of body and of about the same length as the rays; last portion of fin and of anal rather angular, interspinous membrane very slightly emarginate. Pectoral about as long as the head; third anal spine rather above half the length of the head. Caudal emarginate. *Scales*—on head minute, very small on the body, about twenty rows between lateral line and base of last dorsal spine. Lancet-shaped spine with a posterior process. Least depth of the free portion of the tail equal to 1 diameter of the orbit. *Colour*—general tinge yellowish, with yellow horizontal lines along the body about half the width of the ground-colour, which is bluish. A narrow lightish band over the base of the caudal. Dorsal and anal fins bluish, with several longitudinal yellow bands as on the body.

Hab. Coromandel coast of India.

895. (4.) **Acanthurus triostegus.** (Fig. 54.)

Chætodon triostegus, *Linn. Syst. Nat.* i, p. 463.
Acanthurus triostegus, *Day, Fish. India,* p. 204, pl. xlviii, fig. 2 (see synon.).

Mootah, Tel.; *Kara-pamoowah,* Cing.

D. 9/23–25. P. 15. V. 1/5. A. 3/20–22. C. 17.

Length of head $3\frac{3}{4}$ to 4, of caudal 5, height of body $2\frac{1}{3}$ to $2\frac{2}{5}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Profile from above the orbit to the snout rather concave. *Teeth*—eight lobate incisors on either side of upper jaw, and nine or ten on either side of lower. *Fins*—dorsal spines moderately strong, the last $\frac{1}{5}$ higher

than the longest ray, and equal to $\frac{4}{15}$ or $\frac{1}{4}$ of height of body. Pectoral $\frac{4}{5}$ as long as head. Caudal lunate. *Scales*—rudimentary and cycloid on head, small and etenoid on body; about twenty rows between lateral line and last dorsal spine. Lancet-shaped spine with a sharp posterior process. Least depth of free portion

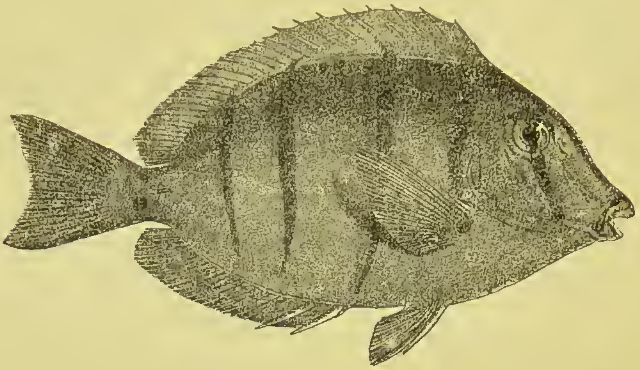

Fig. 54.—*Acanthurus triostegus.*

of the tail equal to about $1\frac{1}{2}$ diameters of the orbit. *Colour*—greenish, with a brownish tinge along the back. One vertical dark band along the snout, a second through the orbit, four down the body, and one over the base of the caudal fin, the last being in the form of two rounded blotches, one above, the other below the lateral line. Fins stained darkish.

Hab. Seas of India, the Malay Archipelago, and beyond. Common at the Andaman Islands; rare at Madras.

896. (5.) Acanthurus tennentii.

Acanthurus tennentii, *Günther, Catal.* iii, p. 337; *Day, Fish. India*, pp. 204, *Suppl.* p. 788.

D. 9/25. P. 17. V. 1/5. A. 3/22. C. 17.

Length of head $4\frac{1}{2}$, of caudal $5\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $2\frac{1}{2}$ diam. from end of snout. Nostrils $\frac{2}{3}$ the length of head from end of snout. *Teeth*—eight lobate incisors on either side of the upper, and eight on either side of the lower jaw. *Fins*—last dorsal spine nearly $\frac{1}{3}$ the height of the body, and about equal to the rays; posterior extremity of the soft dorsal and anal rather angular. Pecteral as long as head. Caudal emarginate. *Scales*—about fourteen rows between lateral line and base of last dorsal spine. A posterior process to the lancet-shaped spine. *Colour*—brown, caudal with a broad white posterior edge, having a dark base behind it. The skin in the British Museum has a dark ring on the shoulder which appears very like an ink-mark; the pectoral seems to have been tinged with yellow in its posterior half on the lower side.

Hab. Ceylon and Burma.

897. (6.) Acanthurus matoides.

Acanthurus matoides, *Cuv. & Val. H. N. Poiss.* x, p. 204; *Day, Fish. India*, p. 205 (see synon.).

D. 9/25–28. P. 17. V. 1/5. A. 3/25–28. C. 16. Vert. 9/13.

Length of head $4\frac{1}{3}$ to 5, of caudal $4\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{2}{3}$ in length of head, $2\frac{1}{4}$ diam. from end of snout, and 1 apart. Profile from snout to dorsal fin much elevated, and having a slight depression above the orbits. Distance from anterior nostril to front edge of upper jaw equals about $\frac{2}{3}$ of length of head; from eye to angle of mouth $\frac{2}{3}$ to $\frac{3}{5}$ of the same. Operele striated. *Teeth*—eight or nine lobate or serrated incisors on either side of each jaw. *Fins*—dorsal spines of moderate strength, the last not quite so high as the first few rays, and nearly $\frac{1}{3}$ the height of the body; the interspinous membrane scarcely emarginate; posterior extremity of fin and of anal angularly rounded; pectoral nearly as long as the head. Ventral pointed, $\frac{4}{5}$ as long as pectoral. Third anal spine 2 diam. of the orbit in length; rays not quite so long as those of dorsal. Caudal emarginate; in adults upwards of a foot in length the outer rays become elongate. *Scales*—rudimentary and cycloid on head, shoulders, and chest, and in a band along base of dorsal fin; ctenoid and in irregular rows on the body, about 18 to 20 rows between lateral line and base of last dorsal spine. Lancet-shaped spine with a posterior process. Height of free portion of tail at lowest part half the length of head. *Colour*—brown, sometimes with narrow light bands across the cheeks and along the body; lips black; dorsal and anal fins with several longitudinal bands; caudal with a white band across its base, sometimes the rest of the fin is light-coloured, with a crescentic dark mark at its posterior extremity. Outer half of pectoral yellowish green.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond. This fish is reputed to attain to 3 feet in length at Madras.

898. (7.) Acanthurus gahm.

Acanthurus gahm, *Cuv. & Val. H. N. Poiss.* x, p. 219.
Acanthurus mata, *Cuv. & Val. H. N. Poiss.* x, p. 202; *Day, Fish. India*, p. 205, pl. xlviii, fig. 1, *Suppl.* p. 789 (see synon.).

Koli, Tam.

D. 9/24–27. P. 17. V. 1/5. A. 3/23–25. C. 16.

Length of head $4\frac{3}{4}$, of caudal $4\frac{2}{3}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $2\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Profile from snout to dorsal fin nearly straight. Distance from anterior nostril to front edge of upper jaw is not quite half the length of head, it is about the same distance from lower edge of eye to angle of mouth. Operele strongly striated, more strongly so and with a larger number of elevations

than in *A. matoides*. *Teeth*—eight or nine incisors on each side of both jaws, serrated along $\frac{4}{7}$ of their external edges. *Fins*—dorsal spines increase in length to the last, which is nearly or quite as high as the anterior rays and $\frac{1}{3}$ the height of the body; the interspinous membrane scarcely emarginate; the posterior portion of the fin and of the anal angularly rounded. Pectoral as long as head. Third anal spine equal to about $1\frac{2}{3}$ diam. of orbit, and the rays similar to those of soft dorsal. Caudal emarginate, upper lobe the longer. *Scales*—rudimentary on head and over the nape, becoming ctenoid and in angular rows on the body; there appear to be about 150 to 160 rows descending to the lateral line, and about 16 or 18 rows between lateral line and base of last dorsal spine. Lancet-shaped spine on side of tail with a posterior process. *Colour*—blackish brown; lips and fins black.

Hab. Red Sea, seas of India to the Malay Archipelago; said to attain 18 inches in length.

899. (8.) Acanthurus celebicus.

Acanthurus celebicus, *Bleeker*, *Batavia Nat. Tijdsch.* iii, p. 761; *Day, Fish. India*, p. 206 (see synon.).

D. 8–9/26–35. P. 16. V. 1/5. A. 3/24. C. 16.

Length of head $4\frac{3}{4}$, of caudal $3\frac{2}{3}$, height of body nearly 3 in the total length. *Eyes*—diameter about $3\frac{3}{4}$ in length of head. Profile of snout concave. *Teeth*—about 16 lobate incisors in the upper, and 20 in the lower jaw. *Fins*—last dorsal spine the longest; dorsal and anal rays of about the same height and about $\frac{3}{7}$ of that of the body, the posterior extremity of both fins obtusely rounded. Ventral fins and caudal lobes pointed. *Scales*—small, ctenoid, but much larger than in *A. matoides* or *A. mata*, there being about 80 rows. *Colour*—brownish, darkest about the head; lips black, a white ring round the mouth. Dorsal, anal, and ventral fins blackish brown; outer half of pectoral yellowish. Caudal blackish, posteriorly yellowish.

Hab. Malay Archipelago. Kner states that he received a single specimen from Madras.

900. (9.) Acanthurus melanurus.

Acanthurus melanurus, *Cuv. & Val. H. N. Poiss.* x, p. 240; *Day, Fish. India*, p. 206 (see synon.).

D. 9/25–26. P. 15. V. 1/5. A. 3/24. C. 16.

Length of head $3\frac{1}{2}$, of caudal 5, height of body 2 in the total length. *Eyes*—diameter $2\frac{1}{3}$ in length of head, 1 diam. from end of snout. *Fins*—second dorsal spine longest and strongest, being nearly equal to 1 diam. of the orbit. Caudal cut square or slightly emarginate. *Scales*—rudimentary or absent. *Colour*—brownish white,

with a black band over occiput and another over free portion of tail. From the whole of the space below the eye and opercle a silvery band passes downwards to the chest. One specimen has a dark mark on the shoulder.

Hab. Seas of India to the Malay Archipelago.

901. (10.) Acanthurus hepatus.

Teuthis hepatus, *Linn. Syst. Nat.* i, p. 507.
Acanthurus hepatus, *Day, Fish. India*, p. 206 (see synon.).

D. 9/19–20. P. 15. V. 1/2. A. 3/19. C. 17.

Length of head $4\frac{1}{2}$, of caudal 6, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 5 in length of head, $3\frac{1}{2}$ diam. from end of snout, and 2 apart. Upper profile of head rather convex. Preopercle entire. *Teeth*—six lobate incisors on either side of both jaws. *Fins*—last dorsal spine higher than first ray, behind which the height of the rays gradually diminishes, the end of the fin being rather angular; interspinous membrane scarcely emarginate. Pectoral $\frac{4}{5}$ length of head. Ventral spine strong, nearly $\frac{1}{2}$ as long as the head, the inner ray also spiny at its commencement, but having a bifurcated rayed extremity. Caudal emarginate, the outer rays prolonged. *Scales*—the dermal productions are stellate and rough, about 12 rows exist between lateral line and base of last dorsal spine; none on the fins. Lancet-shaped spine on side of tail, without any exposed posterior process. *Colour*—slaty grey on the back, becoming dashed with brownish grey along the abdomen. A deep brown band ascends from the posterior upper angle of the eye, and passing backwards gradually widens until below the fifth or sixth dorsal spine it extends over the upper half of the back, leaving an oval spot of ground-colour, as long as the head, uncovered in the middle of the first part of its course. Just before reaching the lancet-shaped process the band divides into two portions, which rapidly narrow and pass along either side of the lobes of the tail. Dorsal spines orange-brown, membrane light slate-colour, upper edge of the fin stained black. Pectoral blackish grey, with a large yellow oval spot on its last fourth. Anal similar to dorsal. Caudal canary-yellow, this colour extends on to the free portion of the tail as far as the lancet-shaped spine.

Hab. Seas of India to New Guinea.

902. (11.) Acanthurus strigosus.

Acanthurus strigosus, *Bennett, Zool. Journal.* iv, fasc. xiii, p. 41; *Day, Fish. India*, p. 207, pl. xlvii, fig. 2, *Suppl.* p. 789 (see synon.).

D. 8/28–30. P. 17. V. 1/5. A. 3/26–27. C. 17. L. l. ca. 120.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, of caudal 4 to $4\frac{1}{2}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—high up, diam. 4 in length of head, nearly $2\frac{1}{4}$ from end of snout, and $1\frac{1}{3}$ apart. Profile of snout very gibbous.

Mouth compressed so as to become angular. *Teeth*—setiform, movable, their outer third dilated and spoon-shaped, with three deep clefts, making them appear laterally serrated; about 21 in the upper and 20 in the lower jaw. *Fins*—last dorsal spine $\frac{1}{6}$ shorter than longest ray, and $\frac{1}{2}$ length of head; soft portions of dorsal and anal fins rather angular posteriorly. Pectoral nearly as long as head. Caudal deeply lunate. *Scales*—rounded, small, and cycloid on the head, ctenoid on the body, about nine rows between lateral line and base of last dorsal spine. Lancet-shaped spine, with a sharp posterior process. Free portion of tail in its least depth equal to $\frac{4}{9}$ of length of head. *Colour*—body horizontally lineated with narrow bluish lines on a yellow ground-colour, the latter being somewhat the wider; numerous dull red spots about the head, more especially around the eyes. Dorsal and anal fins also lineated, and a light vertical band on the middle of the caudal.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago, and beyond.

903. (12.) Acanthurus xanthurus.

Acanthurus xanthurus, *Blyth, Kelaart, Prod. Faun. Zeyl., Append.* p. 50; *Day, Fish. India*, p. 207 (see synon.).

D. 5/24–25. P. 15. V. 1/5. A. 3/20–21. C. 17.

Length of head $4\frac{1}{2}$, of pectoral 5, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. *Teeth*—in a single row, 10 lobate incisors on either side of upper jaw. *Fins*—last dorsal spine longest, almost equalling length of longest ray, and $\frac{2}{5}$ of height of body; dorsal rays nearly half as high as body, the posterior ends of dorsal and anal fins rather angular; third anal spine the longest and strongest; caudal slightly emarginate. *Scales*—on the head very rough, somewhat similar to what is seen in *Balistes*, those on the body are likewise rough, but in a less degree; some of these roughnesses are continued on to the rays of the dorsal and anal fins, and a few between the spines and rays of the former, but more at the base only of the anal. No posterior process to the lancet-shaped spine, but two or three elevations near its base. *Colour*—blackish, caudal canary-yellow; head and shoulders reticulated with grey; end of the pectoral stained with yellow.

Hab. Red Sea, East coast of Africa, and Ceylon. Grows to at least 8 inches in length.

904. (13.) Acanthurus velifer.

Acanthurus velifer, *Bloch, Ich.* t. 427, fig. 1; *Day, Fish. India*, p. 207 (see synon.).

Grumbum, Tam.

D. 3–4/28–29. P. 17. V. 1/5. A. 3/22–24. Vert. 9/13. Cæc. pyl. 7.

Length of head 4 to $4\frac{3}{4}$, of caudal 5, height of body from 2 to 3 in the total length. *Eyes*—diameter 3 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Profile over snout concave. *Teeth*—six lobate incisors on each side of the upper jaw. *Fins*—dorsal very elevated, fourth dorsal ray highest; anal also elevated, but not so much so as the dorsal, it begins under ninth dorsal ray. *Scales*—rudimentary, ctenoid. *Colour*—greyish, with nine vertical bands, having white edges, from back to abdomen. The ocular band passes through the eye to the base of the ventral fin; the second band through the base of the pectoral to the anus. Head sometimes with white spots. Dorsal with four curved blue or white bands, six on the anal and four on the caudal; these bands are more or less continuations of those on the body, but more vertically curved. Caudal usually spotted with white or a light colour.

Hab. From the Red Sea and east coast of Africa, through the seas of India to New Guinea.

2. Genus **NASEUS**, Commerson.

Syn. *Monoceros*, Bl. Schn.; *Naso*, Lacép.; *Aspisurus* (Lacép.), Rüpp.; *Axinurus* and *Priodon*, Cuv. & Val.; ? *Keris*, part., Cuv. & Val.; *Callicanthus*, Swainson.

Branchiostegals four or five; pseudobranchiæ well developed. Body rather elevated and compressed. Eyes high up; in front of them there is a bony prominence, frontal horn, or crest-like protuberance. Teeth in the jaws in a single row, and sometimes serrated on the edges; palate edentulous. A single dorsal fin, with few spines (4–6) and many rays. Anal with two spines, its rays similar to those of the dorsal. Ventral 1/3. Scales rudimentary, in the form of roughnesses of the skin like shagreen. Free portion of the tail with from 1 to 3 keeled bony plates on either side in the adult; they are indistinct or even absent in young specimens. Air-bladder large, posteriorly forked. Pyloric appendages few (5–8).

These fishes are said to have a very convoluted intestinal tract and to be herbivorous. They are found off Ceylon, and probably may be taken at the Andamans.

Geographical Distribution. Tropical Pacific and Indian Oceans.

Synopsis of Indian Species.

Teeth smooth. Anterior surface of forehead prominent	1. *N. tuberosus*, p. 146.
Teeth finely serrated. A horn from opposite lower portion of eye	2. *N. brevirostris*, p. 146.
Teeth smooth. Forehead with a long horn from opposite upper third of eye	3. *N. unicornis*, p. 147.

905. (1.) Naseus tuberosus.

Naso tuberosus, *Lacép. H. N. Poiss.* iii, p. 111, t. vii, fig. 3.
Naseus tuberosus, *Day, Fish. India*, p. 208 (see synon.).

B. v. D. 5–6/26–30. P. 18. A. 2/27–28. C. 16.

Length of head $4\frac{1}{2}$ to 5, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 5 in length of head, $2\frac{1}{2}$ to $3\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. Anterior profile of snout convex, forming a crest-like prominence in adults. *Teeth*—rather compressed, pointed; 18 to 20 on either side of both jaws. *Fins*—in young specimens the dorsal spines appear to be comparatively longer than in adults; in one of the latter the length of fourth spine equalled its distance from base of first. Pectoral $\frac{3}{4}$ of length of head. Caudal emarginate, but subject to great variation, in some being almost truncated, whilst in others the outer rays are considerably produced. Free portion of the tail with two strong sharp lancet-shaped spines, one behind the other on either side in adults. *Colour*—grey, becoming dull yellow along the abdomen and covered with small dark spots. Dorsal and anal fins with a narrow dark base, outside this is a broad orange band, margined with black and externally edged with white. Pectoral and caudal edged with white.

Hab. From the Mauritius and Ceylon to Polynesia.

906. (2.) Naseus brevirostris. (Fig. 55.)

Naseus brevirostris, *Cuv. & Val. H. N. Poiss.* x, p. 277, pl. 291; *Day, Fish. India*, p. 209, pl. xlviii, fig. 4 (see synon.).

B. v. D. 6/27–29. P. 16. A. 2/28–30. C. 16.

Length of head $4\frac{1}{2}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $2\frac{1}{4}$ diam. from end of snout, and

Fig. 55.—*Naseus brevirostris.*

$1\frac{1}{4}$ apart. Profile from snout to above orbits very abrupt; a large horizontal horn, varying in size with age, in front of the eyes. *Teeth*—small, about 40 in either jaw, and finely serrated. *Fins*—

height of fifth dorsal spine equals its distance from base of first, the spines not quite so high as the rays. Anal rays not so high as those of the soft dorsal. Caudal emarginate. Free portion of tail with two moderately strong spines on either side. *Colour*—greyish, with numerous short blue transverse spots or lines in the posterior half of the body. Caudal with a light edge.

Hab. Red Sea, seas of India, Malay Archipelago, and Polynesia.

907. (3.) **Naseus unicornis.**

Chætodon unicornis, *Forsk. Descr. Anim.* p. 63, *and Icones,* t. xxiii.
Naseus unicornis, *Day, Fish. India,* p. 209 (see synon.).

B. iv. D. 5–6/27–28. P. 17. A. 2/26–28. C. 16.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 4 to $5\frac{1}{2}$ in length of head, $3\frac{1}{4}$ to 4 diam. from end of snout, and $1\frac{1}{2}$ apart. Forehead with a long projecting horn on a level with the middle or upper edge of the eye, and increasing in length with age; in a fish 10 inches long it is $\frac{1}{2}$ inch, in another of 14 inches it is 1 inch, whilst in a third a little over 20 inches long it is $3\frac{1}{8}$. *Teeth*—rather compressed, pointed, with smooth edges, and about 15 on either side of both jaws. *Fins*—length of 5th dorsal spine equals its distance from first spine and is $\frac{1}{4}$ higher than the rays. Pectoral $\frac{2}{3}$ as long as head. Anal rays not quite so high as those of soft dorsal. Caudal slightly emarginate. Free portion of tail with two strong lancet-shaped spines on either side. *Colour*—greyish above, becoming tinged with yellow on the abdomen; dorsal and anal fins with longitudinal orange stripes and a blue outer edge; tail yellowish.

Hab. Red Sea, east coast of Africa, seas of India to Polynesia.

Family XVII. CARANGIDÆ.

Scomberoidei, pt., et *Squamipinnes,* pt., Cuv.; *Scombrisidæ,* pt., Richardson.

Body oblong, elevated, or subcylindrical and compressed. Gill-openings wide. Eyes lateral. Infraorbital bones do not articulate with the preopercle. Dentition varied. The spinous portion of the dorsal fin is shorter than the soft, and is sometimes formed by isolated spines; the posterior portion both of the dorsal and anal sometimes consists of detached finlets; the soft dorsal and the anal of nearly equal extent. Ventrals, when present, thoracic, sometimes rudimentary. Scales usually small, unless absent. Lateral line wholly, partially, or not at all armed with shield-like plates. Air-bladder present. Pyloric appendages usually in large numbers. Vertebræ 10/14 (*Naucrates* 10/16).

Some of the young fishes of this family have an armature about the head, which disappears as they grow older. I obtained no examples of this family when in Sind and Baluchistan.

Synopsis of Indian Genera.

A. Anal spines detached from soft portion of fin.
  a. Lateral line partly or wholly composed of keeled shields .... 1. CARANX.
  b. No shields on lateral line.
    a'. Abdomen trenchant .... 2. MICROPTERYX.
    b'. Abdomen rounded.
      a''. First dorsal continuous.
        No detached finlets behind dorsal and anal .... 3. SERIOLA.
        A detached finlet or two behind dorsal and anal .... 4. SERIOLICHTHYS.
      b''. First dorsal composed of detached spines in adults.
        No finlets, a keel on each side of the tail. 5. NAUCRATES.
        Posterior rays of dorsal and anal detached as finlets .... 6. CHORINEMUS.
        No finlets, no keel on side of tail ...... 7. TRACHYNOTUS.
B. Anal spines attached by membrane to soft portion of fin.
  Body high and much compressed; ventrals rudimentary .... 8. PSETTUS.
  Body high and much compressed; ventrals well developed .... 9. PLATAX.
  Two separate dorsal fins .... 10. PSENES.
  Mouth very protractile. Teeth small and equal .... 11. EQUULA.
  Mouth very protractile. Canine-like teeth. Lower edge of preopercle serrated ...... 12. GAZZA.
  Canine-like teeth. Lower edge of preopercle entire .... 13. LACTARIUS.

1. Genus **CARANX**, Lacép.

Syn. *Trachurus, Olistus, Blepharis, Gallichthys, Scyris*, et *Hynnis*, Cuv. & Val.; *Megalaspis, Decapterus, Selar, Carangichthys* (young), *Carangoides, Leioglossus, Uraspis, Selaroides, Gnathanodon*, and *Hemicaranx*, Bleeker; *Carangus* (Cuv. & Val.), Girard; *Trachurops, Carangops*, and *Paratractus*, Gill.

Bángada, Maráthi.

Branchiostegals seven; pseudobranchiæ. Body oblong, subcylindrical, and more or less compressed. Dentition feeble. Two dorsal fins; the first continuous, having about eight weak spines, which are sometimes rudimentary, at its anterior base is a recumbent spine directed forwards; the second dorsal longer than the first and similar to the anal; sometimes the last rays of both these fins wholly or semi-detached; two preanal spines (which may be rudimentary) separated by an interspace from the rays. Caudal forked, in general deeply. Scales minute. Lateral line with an anterior curved portion, the posterior straight, having large plate-

like scales, which are usually keeled and sometimes spiny. Air-bladder bifurcated posteriorly. Pyloric appendages in large numbers.

Geographical Distribution. Almost all temperate and tropical seas.

The genus *Caranx* contains so many varieties of forms that it has been subdivided greatly.

Synopsis of Indian Species.

A. Teeth on the palate.
- *a.* Several detached finlets behind dorsal and anal fins . . . . 1. *C. rottleri*, p. 150.
- *b.* A single detached finlet behind dorsal and anal . . . . 2. *C. kurra*, p. 151.
- *c.* No detached finlets.
  - *a'.* First dorsal fin developed.
    - *a''.* Outer series of upper teeth distinctly enlarged.
      - *a'''.* Height of body less than $\frac{1}{3}$ total length.
        - Chest in front of ventrals scaled . . 3. *C. melampygus*, [p. 152.
        - Chest in front of ventrals scaleless . . 4. *C. jarra*, p. 152.
      - *b'''.* Height of body about $\frac{1}{3}$ total length.
        - *α.* Chest chiefly or wholly scaleless. 5. *C. carangus*, p. 153.
        - *β.* Chest scaled.
          - Height of preorbital $=\frac{1}{2}$ diameter of orbit . . . . 6. *C. hippos*, p. 154.
          - Height of preorbital $=\frac{3}{4}$ to $1\frac{1}{2}$ diam. of orbit . . . . 7. *C. sansun*, p. 155.
    - *b''.* Teeth in jaws subequal.
      - *a'''.* Chest scaleless; height of body less than $\frac{2}{7}$ of total length.
        - D. 8 | 1/30–31. A. 2 | 1/25–27. Maxilla not reaching below orbit. 8. *C. gymnostethoides*, [p. 155.
        - D. 7–8 | 1/24–28. A. 2 | 1/22. Maxilla extending below orbit . . 9. *C. ferdau*, p. 156.
      - *b'''.* Chest scaled.
        - Height of body contained $4\frac{1}{2}$ to $4\frac{2}{3}$ times in total length. Sc. l.* 27–32. Teeth in a single row in both jaws . . . . 10. *C. crumenophthalmus*, p. 156.
        - Height of body 4 in total length. L. l. becomes straight below 6th dorsal spine. Sc. l. 46 . . . . 11. *C. boops*, p. 157.
        - Height of body $3\frac{1}{2}$ in length. L. l. becomes straight below first dorsal ray. Sc. l. 46–53 . . . . 12. *C. djedaba*, p. 158.
        - Height of body $3\frac{3}{4}$ to $4\frac{1}{4}$ in length. L. l. becomes straight below 7th dorsal ray. Sc. l. 42–47. Teeth in front of jaws in more than one row . . . . 13. *C. affinis*, p. 158.

* Sc. l., see note on next page.

Height of body 3 to $3\frac{1}{3}$ in length. L. l. becomes straight below 5th dorsal ray. Teeth in jaws in a single row. Sc. l. 40–44 ...... 14. *C. kalla*, p. 160.
Height of body $3\frac{2}{3}$ to 4 in length. L. l. becomes straight below 8th dorsal ray. Teeth in jaws in villiform bands. Sc. l. 26–28.... 15. *C. ire*, p. 160.
Height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in length. Sc. l. 13 .... 16. *C. compressus*, p.161.
c‴. Chest scaleless; height of body not less than $\frac{2}{7}$ of total length
Height of body $2\frac{1}{2}$ times in total length. Anterior dorsal rays $\frac{1}{3}$ height of body .... 17. *C. atropus*, p. 162.
Height of body $2\frac{2}{3}$ in length. Anterior dorsal rays $\frac{3}{8}$ height of body. 18. *C. malabaricus*, p. 163.
Height of body $3\frac{1}{4}$ in length. Anterior dorsal rays $\frac{3}{4}$ height of body. 19. *C. oblongus*, p. 163.
Height of body $3\frac{1}{2}$ in length. Anterior dorsal rays $\frac{4}{7}$ height of body. 20. *C. nigrescens*, p. 164.
Height of body $2\frac{1}{2}$ in length. Anterior dorsal rays as high as body.. 21. *C. armatus*, p. 165.
b′. First dorsal rudimentary or wanting; body elevated, anterior dorsal and anal rays elongate. No scales except along lateral line.
Eye $1\frac{1}{2}$ to $1\frac{3}{4}$ diameters from end of snout........................ 22. *C. gallus*, p. 166.
Eye $\frac{3}{4}$ to 1 diameter from end of snout........................ 23. *C. ciliaris*, p. 166.
B. No teeth on the palate.
Teeth in lower but not in upper jaw. Sc. l. 24–28 .... 24. *C. leptolepis*, p. 167.
Teeth in a single row in both jaws. Sc. l. 55–60 .... 25. *C. nigripinnis*, p. 168.
No teeth in jaws. Sc. l. 13–15 .... 26. *C. speciosus*, p. 168.

908. (1.) Caranx rottleri.

Scomber rottleri, *Bloch, Ich.* x, p. 40, t. 346.
Caranx rottleri, *Rüpp. Atl.* p. 102, *and N. W., Fische*, p. 48; *Day, Fish. India*, p. 213 (see synon.).

Karakara bángada, Marâthi; *Sora parah*, Tel.; *Komara parah*, Tam.

D. 6–8 | 1/9–11+viii–x. A. 2 | 1/8–9+vii–viii. C. 18. Sc. l. 55*.

Length of head $4\frac{2}{3}$ to $5\frac{1}{4}$, height of body $4\frac{1}{4}$ to $4\frac{2}{3}$ in the total length. *Eyes*—with broad anterior and posterior adipose lids, both covering a portion of the pupil; diameter from $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Dorsal and abdominal profiles about equally convex. Cleft of mouth very slightly oblique, lower jaw slightly the longer. *Teeth*—villiform in upper jaw, with an outer row rather widely separated

* Sc. l. in this genus denotes the number of enlarged keeled scales on the posterior portion of the lateral line.

and slightly conical; in the lower jaw two or three rows above the symphysis and a single lateral row. A triangular patch of teeth on the vomer, a long elliptical band on the palatines, and a wide one along the tongue. *Fins*—spines of first dorsal of moderate strength, third to fifth highest, $\frac{2}{5}$ height of body; second dorsal highest anteriorly, where it is from about $\frac{1}{2}$ to $\frac{3}{5}$ height of body. Behind there are from 8 to 10 detached rays. Pectoral falciform and longer than the head. Anal similar to second dorsal but rather lower; 7 or 8 free rays behind. *Scales*—on cheeks, upper edge of opercle, and top of head; only a narrow band in central line in front of ventral fin, otherwise the chest is scaleless. *Lateral line*—about 78 scales (55 being large plates); at first it makes a deep curve, the height of which equals half the length, it becomes straight below middle of first dorsal fin, where wide plates commence, the highest from $\frac{1}{2}$ to $\frac{2}{5}$ of height of body, they are most strongly keeled over the free portion of the tail, which is much depressed. *Colour*—back glossy green, abdomen silvery tinged with yellow; a large black spot on the upper and posterior portion of the opercle. Fins yellow, dorsal and anal tipped with black; upper half of pectoral darker than the lower.

Hab. Red Sea and east coast of Africa, seas of India, Malay Archipelago and beyond. This species is said by fishermen to attain 5 feet in length.

909. (2.) **Caranx kurra.**

Caranx kurra, *Cuv. & Val. H. N. Poiss.* ix, p. 44; *Day, Fish. India*, p. 214, pl. xlviii, fig. 5, *Suppl.* p. 789 (see synon.).

Tedi and *Moti bángada*, Maráthi; *Kurra wodagawah*, Tel.

D. 8 | 1/29-30+i. P. 22. A. 2 | 1/25-27+i. C. 17. Sc. l. 33.

Length of head $3\frac{3}{4}$ to 4, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—with a broad anterior and posterior adipose lid; diameter of eyes 4 in length of head, 1 diameter from end of snout and also apart. Lower jaw the longer; the preorbital has three or four well-marked raised ridges radiating from its centre. *Teeth*—villiform in both jaws, becoming a single row laterally, a triangular spot on the vomer, a narrow row posteriorly in the median line, a row on either palatine, and three rows along the middle of the tongue. *Fins*—spines of first dorsal weak, third longest, $\frac{3}{5}$ height of body; anterior portion of second dorsal highest and $\frac{2}{5}$ height of body, a detached ray behind; anal similar to second dorsal, also with a detached ray behind. *Scales*—on upper surface of head, on cheeks and opercles, also all over the body including the chest. A low sheath along second dorsal and anal fins. *Lateral line*—88 scales; it continues nearly straight until opposite the end of the first dorsal, where it gradually descends, and from below the 15th ray it goes direct to the middle of the tail. The enlarged scales a first are moderately keeled, the broadest $\frac{1}{5}$ to $\frac{2}{11}$ the height of the body. *Colour*—bluish above, becoming silvery

below. A deep black spot on upper margin of opercle; upper surface of head minutely dotted with black. Fins yellow, darkest at their edges.

Hab. Red Sea, throughout the seas of India and the Malay Archipelago. A small species, attaining 6 or 7 inches in length; it arrives in Madras about October.

910. (3.) Caranx melampygus.

Caranx melampygus, *Cuv. & Val. H. N. Poiss.* ix, p. 116; *Day, Fish. India*, p. 214, pl. 1, fig. 3, *Suppl.* p. 789 (see synon.).

Kuroogoo parah, Tel.

D. 8 | 1/21–23. P. 22. V. 1/5. A. 2 | 1/17–19. C. 19. Sc. l. 34–36.

Length of head from $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—with broad posterior adipose lids, extending $\frac{2}{3}$ across the iris, diameter $3\frac{3}{4}$ to $4\frac{1}{3}$ in length of head, $1\frac{1}{3}$ diam. from end of snout, and 1 apart. Dorsal profile rather more convex than abdominal. Lower jaw slightly the longer; the maxilla reaches to below the middle of the orbit. *Teeth*—in a villiform band in the premaxillaries, the outer row conical and enlarged, a single row in the lower jaw; teeth also occur on vomer, palatines, and tongue. *Fins*—dorsal spines of moderate strength, third highest and $\frac{1}{3}$ height of body; soft dorsal having its anterior rays elongate, and $\frac{2}{3}$ height of body; anal similar but rather lower. Pectoral falciform and $\frac{2}{7}$ of total length. *Scales*—on upper margin of head, on cheeks, chest, and body; a low sheath along bases of soft dorsal and anal fins. *Lateral line*—90 to 95 rows of scales; at first it slightly ascends, then curves to below the 6th or 8th dorsal ray, height of arch not quite $\frac{1}{4}$ of the length; keeled scales along most of the straight portion, the highest $\frac{1}{8}$ or $\frac{1}{9}$ the height of the body. *Colour*—greenish gold along the back, silvery along the abdomen; a small black spot on the opercle; dorsal and anal fins dark anteriorly.

Hab. Red Sea, seas of India to the Malay Archipelago and Pacific. The largest specimen I have seen was 2 feet long.

911. (4.) Caranx jarra.

Caranx jarra, *Cuv. & Val. H. N. Poiss.* ix, p. 109; *Day, Fish. India*, p. 215 (see synon.).

Korandilli parah, Tam.; *Jarra-dandrée parrah*, Tel.

D. 8 | 1/22. P. 21. V. 1/5. A. 2 | 1/18. C. 18. Sc. l. 33–36.

Length of head $4\frac{1}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—with broad posterior adipose lids extending $\frac{2}{3}$ across the iris, diameter $4\frac{2}{3}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and rather above 1 apart. Dorsal profile a little more convex than that of the abdomen. The jaws are of about the same length ante-

riorly; the maxilla reaches to below the middle of the orbit. The greatest height of the preorbital equals 1 diameter of the eye. *Teeth*—villiform in the premaxillaries, with an external conically enlarged row; villiform in the lower jaw, on the vomer, palatines, and tongue. *Fins*—dorsal spines increase to the third, which is $\frac{3}{8}$ height of body; first few rays of second dorsal elevated, the highest being $\frac{3}{5}$ height of body. Pectoral falciform, $\frac{3}{10}$ of total length. Anal similar to soft dorsal, its first few rays $\frac{1}{2}$ as high as body. *Scales*—cover the cheeks, upper portion of opercles, and behind the eyes, but none exist along the median longitudinal crest on the head, which is well developed. They are also absent from the chest in front of the ventral fins. They form a distinct sheath to bases of soft dorsal and anal. *Lateral line*—90 scales; in its first half it forms a low, undulating arch, which terminates below seventh dorsal ray; height of arch $\frac{2}{9}$ length of its base. The keeled scales begin at commencement of straight portion of lateral line, becoming largest below end of second dorsal, where they are $\frac{1}{9}$ of height of body. *Colour*—greenish above, becoming a dull white on the sides and below. No opercular spot.

Hab. Seas of India to the Malay Archipelago; attaining at least a foot in length.

912. (5.) Caranx carangus.

Scomber carangus, *Bloch*, *Ich.* t. 340.
Caranx carangus, *Day*, *Fish. India*, p. 215, pl. 1, fig. 4 (see synon.).

D. 8 | 1/20–22. P. 21. V. 1/5. A. 2 | 1/15–18. C. 19. Sc. l. 33–37.

Length of head $4\frac{1}{3}$, height of body 3 in the total length. *Eyes*—with narrow posterior adipose lids, diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Dorsal profile rather more convex than that of abdomen. Lower jaw slightly the longer; the maxilla extends to beneath middle of eye. Central longitudinal crest on the head well developed. Greatest height of preorbital equals $\frac{2}{3}$ diameter of eye. Lower edges of sub- and interopercles more or less crenulated. *Teeth*—villiform in the premaxillaries, with an outer enlarged conical row; a single row in the lower jaw, with some of the teeth larger than the others; a triangular spot on the vomer, a band on the palatines, and also along the middle of the tongue. *Fins*—dorsal spines of moderate strength, third longest, and $\frac{1}{3}$ the height of the body or $\frac{3}{4}$ that of the anterior dorsal rays. Pectoral slightly longer than head. *Scales*—a few round the eye on the hind portion of the opercle, in a patch in front of the ventral fins, but usually none anterior to the base of the pectoral or below its anterior half; the skin, however, is puckered and wrinkled into little pits, and occasionally the scales extend halfway to between the ventral and anal fins. *Lateral line*—90 to 95 scales; the arched portion terminates rather abruptly below the third or fifth dorsal ray, the height of the arch equals $\frac{3}{10}$ the length of its base, whilst the length of its base equals $\frac{3}{5}$

that of the straight portion. Keeled scales commence at beginning of the latter, becoming well developed below last third of second dorsal, where they are $\frac{1}{8}$ to $\frac{1}{9}$ height of body. *Colour*—silvery along the back, golden on the sides and below. Four or five broad vertical bands on the body in immature specimens. Fins golden, except the first dorsal, which is grey; the tip, and sometimes the entire upper edge of the second dorsal and end of upper lobe of caudal, black. Usually no opercular spot in Indian specimens, and when present it is mostly small.

Hab. Seas of India, Indian Ocean, and tropical Atlantic. At Madras specimens attain a large size.

913. (6.) Caranx hippos.

Scomber hippos, *Linn. Syst. Nat.* i, p. 494.
Caranx hippos, *Day, Fish. India,* p. 216, *Suppl.* p. 789 (see synon.).

Nya hnee shway, Burmese.

D. 7–8 | 1/19–22. P. 22. A. 2 | 1/14–17. C. 21. Sc. l. 30–36.

Length of head 4, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—with posterior adipose lids, reaching $\frac{1}{2}$ or $\frac{2}{3}$ the distance to the pupil, diameter $3\frac{2}{3}$ of length of head, 1 diam. from end of snout and also apart. Dorsal and abdominal profiles about equally convex. Lower jaw slightly the longer; the maxilla reaches to below the last third of the orbit. Greatest height of preorbital equals $\frac{1}{2}$ the diameter of the eye. *Teeth*—villiform, an enlarged outer row in the premaxillaries; a single row in the lower jaw, amongst which occasionally are a few larger ones, a pair of well-marked canines above the symphysis; a triangular patch on the vomer, a band on the palatines, also along the tongue. *Fins*—third dorsal spine longest and from $\frac{1}{3}$ to $\frac{4}{13}$ height of body; anterior dorsal rays equal to $\frac{4}{9}$ height of body. Pectoral $\frac{1}{5}$ longer than head. Anal similar to, but lower than, the second dorsal. *Scales*—on cheeks, body, and chest. *Lateral line*—80 scales; it forms an arch $\frac{1}{3}$ as high as long, ending below the sixth dorsal ray, the length of the arch equalling $\frac{2}{3}$ of that of the straight portion; keeled plates extend the whole distance along the horizontal portion, the largest being below last portion of second dorsal, and $\frac{1}{10}$ the height of the body. *Colour*—body golden, having a tinge of grey along the back. A small black spot on the opercle just before commencement of lateral line. Fins yellow, summit of second dorsal and point of upper caudal lobe deep black, sometimes whole posterior border of caudal fin black-edged. Eyes, bright orange. Usually a dark spot behind base of pectoral fin. The *young* are golden, with four or five broad vertical bands on the body.

Hab. Seas of India, Indo-Pacific and Atlantic Oceans. This species attains a large size, 3 feet or more in length. When captured it grunts like a young pig, and this is repeated whenever it is moved, so long as vitality remains.

914. (7.) Caranx sansun.

Scomber sansun, *Forsk. Descr. Anim.* p. 55, no. 74.
Caranx sansun, *Day, Fish. India*, p. 216, pl. l, fig. 5 (see synon.).

D. 8 | 1/19–20. P. 20. A. 2 | 1/16–17. C. 19. Sc. l. 30–32.

Length of head 4, height of body 3 in the total length. *Eyes*—with a narrow posterior adipose lid, diameter $3\frac{3}{4}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Dorsal profile more convex than that of abdomen. Lower jaw a little the longer; the maxilla reaches to below the last third of the eye. Greatest depth of preorbital equals $\frac{3}{4}$ diameter of the eye in the young to $1\frac{1}{2}$ in the adult. *Teeth*—villiform, an outer row enlarged but irregular in size in the premaxillaries; a single row irregularly sized in the lower jaw, some much larger than others, and a pair of minute canines at the symphysis; a triangular spot on the vomer, a band on the palatines and in a narrow patch along the middle of the tongue. *Fins*—third dorsal spine the highest, equalling $\frac{1}{3}$ height of body and $\frac{2}{3}$ of rays at commencement of second dorsal. Pectoral $\frac{1}{4}$ longer than the head. Caudal deeply forked. *Scales*—on body, chest, and cheeks. *Lateral line*—95 scales; its arched portion ending below sixth dorsal ray, height of arch $\frac{1}{4}$ of its length, and its length $\frac{2}{3}$ to $\frac{3}{4}$ of the straight portion. Keeled scales commence about the third scale of the horizontal portion, becoming well developed beneath last part of soft dorsal, where their height is $\frac{1}{8}$ to $\frac{1}{9}$ of that of the body. *Colour*—silvery along the back, becoming golden below, all the fins yellow, first dorsal greyish. No opercular spot.

Hab. Red Sea and seas of India.

915. (8.) Caranx gymnostethoides.

Carangoides gymnostethoides, *Bleeker, Batavia Nat. Tijdsch.* i, p. 364.
Caranx gymnostethoides, *Day, Fish. India*, p. 217, pl. xlviii, fig. 6 (see synon.).

D. 8 | 1/30–31. P. 21. A. 2 | 1/25–27. C. 17. Sc. l. 22–25.

Length of head 4, height of body 4 in the total length. *Eyes*—with a narrow posterior adipose lid, diameter $5\frac{1}{4}$ in length of head, 2 diam. from end of snout, and $1\frac{3}{4}$ apart. Abdominal profile rather more convex than dorsal. Lower jaw somewhat the longer; maxilla reaches to nearly below front edge of orbit. The preorbital in its deepest part equals 1 diameter of the orbit. *Teeth*—villiform in both jaws, on the vomer, palatines, and along the middle of the tongue. *Fins*—dorsal spines not strong, third and fourth longest and $\frac{2}{7}$ of height of body; first portion of soft dorsal highest, and $\frac{2}{5}$ of height of body. Pectoral rather longer than head. Caudal forked. *Scales*—extended over the cheeks and body, but none on the chest from below the pectoral fin. *Lateral line*—at first makes a long, low curve to below the 16th dorsal ray, the

length of the arch equals that of the straight portion, the height of the more developed plates $\frac{1}{14}$ of the body. *Colour*—greenish along the back, becoming dull silvery white below; an indistinct opercular spot present. Soft dorsal and anal stained with black in their highest portions.

Hab. Seas of India to the Malay Archipelago. A specimen in the Madras Museum is 28 inches long.

916. (9.) Caranx ferdau.

Scomber ferdau, *Forsk. Descr. Anim.* p. 55, no. 71.
Caranx ferdau, *Day, Fish. India*, p. 217, *Suppl.* p. 789 (see synon.).

D. 7–8 | 1/24–28. P. 21. A. 2 | 1/22. C. 17. Sc. l. 25.

Length of head $4\frac{1}{4}$, height of body $3\frac{2}{3}$ to $4\frac{1}{4}$ in the total length. *Eyes*—with a narrow posterior adipose lid, diameter from $4\frac{1}{2}$ to $4\frac{3}{4}$ in length of head, $1\frac{1}{4}$ to 2 diameters from end of snout. Dorsal and abdominal profiles about equally convex. Jaws of about equal length; the maxilla reaches to below the middle of the orbit. Greatest height of preorbital equals $\frac{3}{4}$ of a diameter of the orbit. *Teeth*—villiform in both jaws, on vomer and palate; tongue scabrous. *Fins*—spines of first dorsal increase in length to the third, which is $\frac{2}{7}$ of height of body; anterior portion of second dorsal $\frac{2}{5}$ height of body. Pectoral falciform and $\frac{3}{10}$ of total length. Anterior portion of anal commences below seventh dorsal ray, and is as high as first portion of that fin. Caudal deeply forked. *Scales*—present on cheeks, upper portion of opercle, behind the eyes, also on body, but not on chest in front of ventral fins. A scaly sheath along bases of soft dorsal and anal fins. *Lateral line*—140 scales, in its first half makes a long low curve to below the 13th dorsal ray, the height of the arch being equal to $\frac{1}{5}$ or $\frac{1}{6}$ of its length. The keeled scales developed below the end of the second dorsal fin. *Colour*—greenish along the back, the young having five transverse oval spots or bars on the side of the body. No opercular spot.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago.

917. (10.) Caranx crumenophthalmus.

Scomber crumenophthalmus, *Bloch, Ich.* t. 343.
Caranx crumenophthalmus, *Day, Fish. India*, p. 217, pl. xlix, fig. 1 (see synon.).

D. 8 | 1/24–26. P. 21. A. 2 | 1/21–22. C. 21. Sc. l. 27–32 (36).

Length of head $3\frac{3}{4}$ to 4, height of body $4\frac{1}{2}$ to $4\frac{2}{3}$ in the total length. *Eyes*—with a broad posterior and an anterior adipose lid, diameter 3 to $3\frac{1}{4}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Dorsal and abdominal profiles about equally convex. Lower jaw the longer; the maxilla reaches to below the first third of the eye. Height of the preorbital scarcely equals the diameter of the eye. *Teeth*—a single row in both jaws, in a Λ-shaped band

on vomer, a narrow one on palatines, also along centre of tongue. *Fins*—dorsal spines weak, third and fourth longest, $\frac{1}{2}$ to $\frac{3}{5}$ height of body and rather more than the rays at commencement of soft dorsal, of which the last ray is thickened and slightly prolonged. Pectoral $\frac{4}{19}$ length of body, not so long as head. Caudal rather deeply forked. *Scales*—on body, chest, and cheeks. *Lateral line*—88 scales; a very long, low arched portion running into the straight part below the tenth dorsal ray, but keeled scales do not commence until under the middle of the second dorsal, becoming strongest under its termination, where they are $\frac{1}{8}$ to $\frac{1}{10}$ the height of the body, in the arched portion of the lateral line they are rounded and plate-like. *Colour*—silvery, becoming golden below; usually no opercular spot, but it is present in some specimens from Madras. Fins golden, with fine dots. Caudal tipped with black.

Hab. Red Sea, seas of India, Indo-Pacific and tropical Atlantic; attaining at least 12 inches in length.

918. (11.) Caranx boops.

Caranx boops, *Cuv. & Val. H. N. Poiss.* ix, p. 46; *Day, Fish. India*, p. 218, pl. xlix, fig. 2 (see synon.).

D. 8 | 1/24–25. P. 19. A. 2 | 1/20–21. C. 17. Sc. l. 46.

Length of head $3\frac{3}{4}$ to 4, height of body 4 in the total length. *Eyes*—with a broad posterior adipose lid and a narrower anterior one, diameter $2\frac{3}{4}$ to 3 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout and rather less apart. Snout pointed; lower jaw rather the longer; posterior extremity of maxilla reaches to below centre of orbit; interorbital space nearly flat; preorbital narrow, its height in its deepest part equals $\frac{2}{5}$ to $\frac{1}{2}$ of that of the orbit. Dorsal and abdominal profiles equally convex. Lower edge of pre-, sub-, and interopercles roughened. *Teeth*—in a narrow band or single row on both jaws; in a Λ-shaped patch on the vomer, in a band on the palate and also on the tongue. *Fins*—dorsal spines weak, third and fourth longest, rather more than half height of body at commencement of second dorsal fin; anterior portion of second dorsal rather the highest, but a little lower than the longest dorsal spines. Pectoral not quite so long as the head; anal similar to but rather lower than soft dorsal. Caudal deeply forked. *Scales*—over body, chest, cheeks, and upper jaw; a very low sheath on bases of soft dorsal and anal fins. *Lateral line*—69 scales, forming a rather strong curve anteriorly and becoming straight below the sixth dorsal spine, where the plates immediately begin to be developed; they are large and $\frac{1}{4}$ the height of the body in their broadest part. *Colour*—silvery, darkest along the back, and shot with gold along the abdomen; a small but well-developed opercular spot; dorsal and caudal fins with dark spots.

Hab. Andamans to the Malay Archipelago.

919. (12.) Caranx djedaba.

Scomber djedaba, *Forsk. Descr. Anim.* p. 56, no. 75.
Caranx djeddaba, *Day, Fish. India,* p. 218, pl. xlix, fig. 3 (see synon.).

D. 8 | 1/22–25. P. 21. A. 2 | 1/19–20. C. 17. Sc. l. 46–53.

Length of head $4\frac{3}{5}$ to 5, height of body $3\frac{1}{2}$ in the total length. *Eyes*—having a broad posterior adipose covering, extending on to the pupil in the adult; diameter 4 to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Dorsal and abdominal profiles about equally convex. Lower jaw a little the longer; the maxilla reaches to below the first third of the eye. Depth of preorbital equal to $\frac{2}{3}$ of the diameter of the eye. Central crest along the head well developed. *Teeth*—a fine pointed row in either jaw, a triangular patch on vomer, a narrow band along palatines, also a bony plate, which is finely toothed, on the centre of the tongue. *Fins*—dorsal spines of moderate strength, the third a little the longest and equals $\frac{4}{11}$ to $\frac{1}{3}$ height of body, and nearly as high as anterior rays of second dorsal. Pectoral falciform, $\frac{1}{4}$ to $\frac{2}{7}$ of entire length of fish. Anal commences under the third or fourth dorsal ray. Caudal deeply forked. *Scales*—over body, chest, cheeks, and above hind third of eye, also forming a well-developed sheath to both dorsal and anal fins. *Lateral line*—86 to 90 scales, strongly curved anteriorly, becoming straight below first dorsal ray; the height of the arch equals about $\frac{1}{5}$ of its length; length of arch is $\frac{4}{9}$ of that of straight part; keeled plates commence on first scale of straight portion, becoming most developed below last third of second dorsal, where they are $\frac{1}{8}$ to $\frac{1}{9}$ of height of body. *Colour*—silvery blue along the back, becoming golden on the sides and below; a large black blotch on the opercle at its posterior-superior angle. Fins yellow, the first dorsal tinged with grey, as is also the upper edge of the second dorsal except its most elevated portion, which is white; upper lobe of caudal darker than the lower. In a specimen over 13 inches in length, the summit of the soft dorsal is white and the rest of the fin black; the first dorsal is dark; the anal has a black spot at the base of its first six rays.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond. Common in Madras and considered fair eating; attaining at least 13 inches in length.

920. (13.) Caranx affinis. (Fig. 56.)

Caranx affinis, *Rüpp. N. W., Fische,* p. 49, t. xiv, fig. 1; *Day, Fish. India,* p. 219, pl. xlix, fig. 4 (see synon.).

Warri parah, Tam.

D. 7–8 | 1/24. P. 24. A. 2 | 1/19–20. Sc. l. 42–47. Cæc. pyl. 20.

Length of head $4\frac{1}{2}$, height of body $3\frac{3}{4}$ to $4\frac{1}{4}$ in the total length.

Eyes—with broad anterior and posterior adipose lids, both reaching the pupil; diameter 4 in length of head, rather more than 1 diam. from end of snout, and $1\frac{1}{3}$ apart. Dorsal and abdominal profiles about equally convex; snout rather pointed. Lower jaw the longer; the maxilla reaches to below front edge or first third of orbit. Interorbital space with a raised ridge along its middle. Preorbital in its deepest part equal to nearly 1 diameter of the orbit. *Teeth*—villiform, and in more than one row at symphysis of either jaw, laterally in a single row of moderately large ones, in a Λ-shaped or lozenge-shaped patch on vomer, also on the palatines, and in a very narrow band along the centre of the tongue. *Fins*—fourth dorsal spine rather the longest, $\frac{1}{3}$ height of body, and nearly as high as the commencement of the soft dorsal, the last ray of which is rather prolonged. Pectoral falciform and 1 diameter of the eye longer than the head; spine of anal well developed, and nearly half as long as first ray; the base of the last ray is rather distant from the preceding. Caudal deeply forked. *Scales*—over body, chest, cheeks, but not on the upper jaw or occipital crest, which is moderately developed. *Lateral line*—with a long irregular curve (which is $\frac{3}{4}$ as long as the straight portion), becoming straight below the sixth or seventh

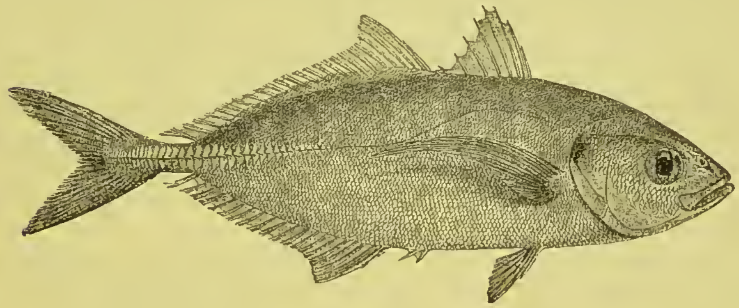

Fig. 56.—*Caranx affinis.*

dorsal ray; the plates begin about the fifth or eighth scale on the straight portion, becoming well developed near the end of the dorsal fin, below which they are $\frac{1}{7}$ the height of the body. About 100 rows of scales along the lateral line. *Colour*—silvery along the back, becoming golden on the abdomen; a series of short vertical bands, as wide as the ground-colour, cross the lateral line along its whole extent. A black shoulder-spot extending on to the opercle. Fins yellow, tip of second dorsal anteriorly white, posteriorly with rather a dark summit; anal with a white edge.

Hab. Red Sea, seas of India, Andamans, to the Malay Archipelago and beyond. At Madras this species is common, especially during the cold months. I have found some full of developed ova as early as March.

921. (14.) Caranx kalla.

Caranx kalla, *Cuv. & Val. H. N. Poiss.* ix, p. 49; *Day, Fish. India* p. 219, pl. xlix, fig. 5 (see synon.).

Kalla parah, Tam.

D. 8 | 1/23-24. P. 20. A. 2 | 1/19-20. C. 17. Sc. l. 40-44.

Length of head $4\frac{1}{2}$ to 5, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—with a developed posterior adipose lid; diameter 3 in length of head, $\frac{2}{3}$ diam. from end of snout, and $\frac{3}{4}$ apart. Abdominal profile more convex than dorsal. Lower jaw the longer; maxilla reaches to below first third of eye. Greatest depth of preorbital equal to half diameter of eye. *Teeth*—in the jaws in a single row in a Λ-shaped spot on vomer, in a band on palatines, also along middle of tongue. *Fins*—dorsal spines of moderate strength, third and fourth longest, $\frac{1}{3}$ height of body, and $\frac{1}{4}$ less than anterior portion of second dorsal. Pectoral falciform, from $\frac{4}{5}$ to as long as height of body. Anal commences below fourth dorsal ray; last anal ray and last dorsal a little elongate. Caudal deeply forked, upper lobe the longer. *Scales*—over the body, chest, and some on the cheeks; a well-developed sheath to dorsal and anal fins. *Lateral line*—having 80 scales, rather strongly curved anteriorly, but not ending abruptly; the height of the arch equals $\frac{1}{3}$ of its length, whilst the length equals $\frac{3}{5}$ that of straight portion, which commences below fourth or fifth dorsal ray. Keeled plates begin at commencement of straight portion, and below end of second dorsal they are $\frac{1}{7}$ of height of body. *Colour*—bluish green above, shot with silver, sides and abdomen silvery, with nacreous reflexions; a distinct black spot on the opercle. The tail and caudal fin brilliant yellow, the upper lobe tinged with green; the other fins white, excepting the dorsal, which has some black upon it.

Hab. Red Sea, seas of India and China; attaining at least 8 inches in length.

922. (15.) Caranx ire.

Caranx ire, *Cuv. & Val. H. N. Poiss.* xix, p. 57; *Day, Fish. India*, p. 220, pl. xlix, fig. 6 (see synon.).

Nune parah and *Karamunji parah*, Tam.; *Ire-parah*, Tam.; *Oolim-par ah* Mal.

D. 8 | 1/23-24. P. 20. A. 2 | 1/19-20. C. 19. Sc. l. 26-28.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, of pectoral 5, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—having a narrow posterior adipose lid extending not quite halfway to the pupil; diameter of eye $3\frac{1}{2}$ to 4 in length of head, 1 to $1\frac{1}{3}$ diam. from end of snout, and nearly $\frac{4}{5}$ apart. Dorsal and anal profiles about equally convex; snout slightly elevated. Jaws of about equal length anteriorly, or the lower slightly the longer; the maxilla reaches to below the front

edge or first third of the eye. Preorbital in its deepest part rather more than $\frac{1}{2}$ diameter of orbit. *Teeth*—in both jaws in villiform bands, which become a single row laterally in the lower; the outer row in the upper jaw a little enlarged; a semilunar spot anteriorly on the vomer, posteriorly a long narrow band along the median line; a band on the palatines and also along the middle of the tongue. *Fins*—spines of first dorsal weak, the third slightly the longest and about $\frac{1}{3}$ height of body. Second dorsal highest anteriorly, where its rays equal from $\frac{1}{2}$ to $\frac{3}{7}$ the height of the body. Pectoral reaches to above commencement of anal, which is similar to soft dorsal. Caudal deeply forked, upper lobe usually the longer. *Scales*—cover the body except just in front of the ventral fins; superiorly they extend forwards on the head to above the eyes, cheeks, and upper portion of the opercle, but there are none on the snout, preorbital, or occipital crest; the soft dorsal and anal fins have a high scaly sheath. *Lateral line*—about 102 scales, at first it is moderately curved, becoming straight below the eighth dorsal ray; the keeled scales do not commence until underneath the fifteenth ray, they are well developed but not very strong, the highest about $\frac{1}{10}$ the height of the body. *Colour*—grey along the back, becoming lighter on the abdomen, the whole glossed with purple and gold. Head and chest occasionally brownish black. No opercular spot. Fins yellow, with black points; anterior portion of second dorsal black with a white tip, rest of fin and of anal more or less dark. Caudal sometimes with black tips and a white edge.

Hab. Seas of India to the Malay Archipelago. Grows to upwards of a foot in length. In Malabar this species is mostly captured during the cold months.

923. (16.) Caranx compressus.

Caranx compressus, *Day, P. Z. S.* 1870, p. 689; *Fish. India*, p. 221, pl. 1, fig. 1 (see synon.).

D. 8 | 1/22–24. P. 21. A 2 | 1/19–20. C. 21. Sc. l. 13.

Length of head 4 to $4\frac{1}{4}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—without adipose lids, situated 1 vertical diameter from the upper profile, diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{3}$ to $1\frac{2}{3}$ diam. from end of snout, and 1 apart. Body rather strongly compressed, dorsal and abdominal profiles equally convex; occipital crest well developed. Greatest width of head $\frac{1}{5}$ the entire length of the head. Lower jaw the longer; maxilla reaches to below front edge or first third of orbit. Greatest depth of preorbital equals $\frac{2}{3}$ to $\frac{3}{4}$ of the diameter of the eye. *Teeth*—villiform in both jaws, a single narrow band laterally in the lower; also present on the vomer, palate, and tongue. *Fins*—third dorsal spine longest, $\frac{1}{3}$ to $\frac{2}{7}$ height of body, and only $\frac{2}{3}$ as high as anterior portion of second dorsal. Pectoral falciform, and $\frac{1}{4}$ longer than the head.

Anal similar to but lower than the second dorsal. Caudal forked. *Scales*—present on cheeks, round posterior edge of eye, the body and chest, also forming a low groove along the bases of second dorsal and anal fins. *Lateral line*—about 150 scales, it forms a very gradual curve to below the 12th dorsal ray, when it becomes straight; the keels are most developed on the free portion of the tail, where the largest equal $\frac{1}{28}$ of height of body. *Colour*—silvery, with a minute opercular spot; vertical margin of preopercle dark.

Hab. Red Sea and Andamans, where a specimen 16 inches long was captured.

924. (17.) Caranx atropus.

Brama atropus, *Bl. Schn. Syst. Ich.* p. 98, t. 23.
Caranx atropus, *Day, Fish. India,* p. 221 (see synon.).

Kunni parah, Tam.

D. 8 | 1/22. P. 22. A. 2 | 1/18. C. 16. Sc. l. 32–35.

Length of head $3\frac{1}{2}$ to 4, of pectoral $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{3}$ to $3\frac{1}{2}$ in length of head, $\frac{2}{3}$ diam. from end of snout and also apart. Body oval, strongly compressed, with the crest on the summit of the head well developed; maxilla reaches to below the middle of the orbit; the lower jaw the longer. The greatest depth of the preorbital equals about one half diameter of eye. *Teeth*—in two rows in both jaws, the outer in the premaxillaries very slightly the larger; in the lower jaw the teeth laterally form only a single row; a triangular patch on the vomer, a narrow band on the palatines and along the middle of the tongue. *Fins*—spines of first dorsal weak, third and fourth longest, and $\frac{1}{5}$ of height of body; second dorsal highest anteriorly, its second ray being $\frac{1}{3}$ of height of body. Pectoral falciform. Ventral with a weak spine and elongate rays which reach as far as anal and are receivable into a groove, at the bottom of which are inserted the two preanal spines. Caudal deeply lobed. *Scales*—a few on the cheeks and below the eye, none on the remainder of the head; body scaled except on chest and from between bases of pectoral and ventral fins to head. A rather high scaly sheath to second dorsal and anal fins. *Lateral line*—about 75 scales, it curves to below fifth ray of dorsal, then the keeled scales commence, the widest, below last fourth of dorsal, being $\frac{1}{17}$ of height of body. *Colour*—bluish green along the back, becoming silvery shot with purple on the sides and beneath; a well-marked black opercular spot; ventrals deep black. The *young* are vertically banded, and the opercular spot indistinct or absent.

Hab. Seas of India to the Malay Archipelago; attaining at least a foot in length.

925. (18.) Caranx malabaricus.

Scomber malabaricus, *Bl. Schn. Syst. Ich.* p. 31.
Caranx malabaricus, *Day, Fish. India*, p. 221, pl. l, fig. 2, *Suppl.* p. 789 (see synon.).

Tollam parah, Tam.

D. 7–8 | 1/21–22. P. 21. V. 1/5. A. 2 | 1/17–18. C. 21. Sc. l. 28.

Length of head $3\frac{3}{4}$ to 4, height of body $2\frac{1}{2}$ in young to $2\frac{2}{3}$ in adult of the total length. *Eyes*—without distinct adipose lids; diameter 3 in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Body oval and strongly compressed, dorsal and anal profiles equally convex. Occipital crest well developed. Lower jaw slightly the longer; maxilla reaches to below first third of eye. Greatest depth of the preorbital nearly equals one diameter of the orbit. *Teeth*—villiform in both jaws, in a somewhat triangular spot on the vomer, an elongate band along the palatines, and likewise along the centre of the tongue, the last widest anteriorly. *Fins*—dorsal spines of moderate strength, second, third, and fourth about the same height and two fifths of that of body; second dorsal fin highest in front, where the rays are $\frac{3}{8}$ the height of the body and are similar to those in the anal. Pectoral rather longer than the head. Ventral small. Caudal deeply forked. *Scales*—on the head there are merely a few behind the middle of the eye, none on the chest. Only a low groove along the first part of the soft dorsal fin. *Lateral line*—90 to 105 scales, it forms a low curve to below the twelfth or thirteenth dorsal ray. Its plates only commence under about the twentieth ray, becoming most developed on free portion of tail, when their greatest depth only equals $\frac{1}{20}$ to $\frac{1}{30}$ of height of body, being proportionately smaller in adults. *Colour*—back bluish, sides and abdomen silvery shot with purple; a dull black mark in axilla. The whole posterior half and upper edge of opercle stained black or brown (dark stain said to be sometimes absent). Dorsal usually stained darkest at its outer edge, the other fins pale yellow.

Hab. Red Sea, seas of India to the Malay Archipelago and Australia; attaining at least a foot in length.

926. (19.) Caranx oblongus.

Caranx oblongus, *Cuv. & Val. H. N. Poiss.* ix, p. 128; *Day, Fish. India*, p. 222, pl. li, fig. 1 (see synon.).

Ro-thul-dah, Andam.

D. 8 | 1/21–22. P. 21. A. 2 | 1/18–19. C. 18. Sc. l. 34–40.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—without distinct adipose lids; diameter $3\frac{1}{4}$ in young to $4\frac{1}{3}$ in adult in length of head, nearly 1 diam. from end of snout, and $\frac{3}{4}$ to 1 apart. Body oval, dorsal profile rather more convex than abdominal, a slight concavity in profile opposite upper third of eye. Occipital crest moderately developed. Lower jaw the longer.

Cleft of mouth oblique; maxilla reaching to below middle of eye. Greatest width of preorbital $\frac{1}{2}$ in young to $\frac{3}{4}$ in adult of diameter of orbit. Preopercle with some rather strong denticulations along both limbs, which become almost imperceptible in the adult. *Teeth*—in a narrow villiform band, or in two rows in the premaxillaries, the outer slightly enlarged; a single row in lower jaw, except at its anterior portion, where they are largest, and have a few villiform ones behind them; a triangular patch on the vomer, and a band along the palatines and on the tongue. *Fins*—dorsal spines low, the longest $\frac{3}{10}$ to $\frac{1}{4}$ height of body; second dorsal very much elevated anteriorly, where its rays equal from $\frac{3}{4}$ to as long as the height of the body. Pectoral as long as the head or longer. Ventral almost reaches the preanal spines. Anterior rays of anal elongate and equal to $\frac{3}{5}$ of height of body. Caudal deeply forked. *Scales*—along the upper and hind edge of the eyes, on the cheeks and body, except on the chest as high as the pectoral fin, which is scaleless in the young, but in the adult the scaleless area is confined to the chest anterior to ventral fin, and about half the distance to the base of the pectoral. A low sheath to second dorsal and anal fins. *Lateral line*—about 105 scales, at first plate-like and rounded; the line goes directly backwards and commences to descend below the commencement of the second dorsal, becoming straight again beneath the ninth ray; the height of the arch equals $\frac{2}{9}$ of its length; the keeled scales extend along the whole of the straight portion, the widest about $\frac{1}{13}$ height of body. *Colour*—golden in the young, with vertical bluish bands, which soon fade after death; the adults are more olive, becoming dull white beneath. No opercular spot. Fins yellow, stained at their edges, the stain due to innumerable fine dots; caudal orange, with its posterior half black, a light tip to both lobes.

Hab. Seas of India to the Malay Archipelago and Polynesia. Largest specimen from Madras, 5 inches long.

927. (20.) Caranx nigrescens.

Caranx nigrescens, *Day, P. Z. S.* 1867, p. 704; *Fish. India*, pl. 1, fig. 6, *Suppl.* p. 789.

Tanga parah, Tam.

D. 8 | 1/19. P. 19. A. 2 | 1/17. C. 19. Sc. l. 23.

Length of head nearly 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—without any adipose lids; diameter 5 in length of head, nearly 2 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile slightly more convex than abdominal; interorbital crest well developed. Lower jaw very slightly the longer, mouth very slightly oblique; maxilla reaches to below front edge of eye. Lower limb of preopercle, also sub- and interopercles crenulated. *Teeth*—in numerous villiform rows in both jaws, a triangular patch on vomer, a long narrow band on palatines, none on tongue. *Fins*—third dorsal spine longest, $\frac{2}{7}$ height of body, and rather above $\frac{1}{2}$ as high as anterior dorsal rays; second dorsal elevated in front. Pectoral

falciform, a little longer than head and reaching to below middle of soft dorsal. Anal similar in form to second dorsal, but a little lower. Caudal deeply forked. *Scales*—on checks round eyes, upper portion of opercle and body, none on chest as high as base of pectoral fin. *Lateral line*—140 scales; at first it forms a very low long curve to below the thirteenth dorsal ray, afterwards it gradually becomes straight; length of base of arch equalling that of straight portion of line. Keeled scales but slightly developed, only the last 8 being distinct; the largest equals $\frac{1}{20}$ of height of body. *Colour*—dusky greyish, having innumerable fine black points, and generally glossed with purple. A well-marked black opercular spot. Fins nearly black, especially the dorsal.

Hab. Madras, where the type (a male, 24 inches long) was captured in March, 1867. The fishermen asserted that this species annually arrived from the deep sea about March.

928. (21.) Caranx armatus.

Sciæna armata, *Forsk. Descr. Anim.* p. 53, no. 68.
Caranx armatus, *Day, Fish. India,* p. 223, pl. li, fig. 2 (see synon.).

Katati kávali, Maráthi; *Tanga parah*, Tam.; *Tchawil parah*, Tel.

D. 6–8 | 1/20–21. P. 21. A. 2 | 1/16–17. C. 19. Sc. l. 20.

Length of head $4\frac{1}{2}$ to 5, of pectoral $3\frac{1}{2}$, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in total length. *Eyes*—with very narrow posterior adipose lids; diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ to 1 diam. from end of snout and also apart. Body oval, dorsal and abdominal profiles about equally convex. Lower jaw the longer; maxilla reaches to below anterior $\frac{1}{3}$ or centre of eye. Greatest depth of preorbital equals $\frac{2}{3}$ diameter of orbit. *Teeth*—villiform in both jaws, with an outer somewhat enlarged row in the premaxillaries, a triangular spot on vomer, and an elongate band along palatines and middle of tongue. *Fins*—second to fourth dorsal spines subequal and about $\frac{2}{9}$ height of body; second dorsal much elongate anteriorly, the first few rays occasionally reaching the caudal; in some specimens all the rays have prolongations, usually only the first few. Pectoral falciform, extending to at least below middle of soft dorsal. Caudal deeply forked. *Scales*—a few on hind portion of head, round the eyes and on the cheeks, also over body except chest anterior to bases of pectoral and ventral fins. They also form a groove for the soft dorsal and anal fins. *Lateral line*—104 scales; it makes a long low curve, becoming straight beneath middle of second dorsal; keeled plates are developed in last half of horizontal portion of lateral line but are not large. *Colour*—upper surface of head and back bluish green, sides of the head and body golden, with purple reflexions. Opercular spot moderately distinct. First dorsal blackish, second and anal yellowish, with darker edges. Pectoral dark behind its base. The *young* vertically banded.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 20 inches in length.

929. (22.) Caranx gallus.

Zeus gallus, *Linn. Syst. Nat.* i, p. 454.
Caranx gallus, *Day, Fish. India,* p. 224, pl. li, fig. 3 (see synon.).

Gurrah parah, Tel.; *Nga thenbau,* Arracan.

D. 0–6 | 1/19. P. 17. A. 0–2 | 1/16. C. 19. Sc. l. 8–10.

Length of head from $3\frac{1}{3}$ at 6 inches to $4\frac{2}{3}$ at 23 inches, height of body $1\frac{3}{4}$ to 3 in the total length. *Eyes*—with only small posterior adipose lids or without any; diameter $3\frac{1}{3}$ to 4 in length of head, $1\frac{1}{2}$ to $1\frac{3}{4}$ diam. from end of snout. Body much elevated, especially in the young, and strongly compressed; central longitudinal crest on the head much raised, causing the dorsal profile before the eyes to be concave. Lower jaw the longer, the maxilla reaches to nearly below the vertical from front edge of orbit. Preorbital very high, from $1\frac{1}{3}$ to $1\frac{2}{3}$ diameters of the orbit. *Teeth*—apparently villiform in young in jaws, vomer, palatines, and tongue, but in adults (23 inches long) they assume an entirely different (or *Sparoid*) character, having rounded crowns, 5 rows in premaxillaries, and 4 in lower jaw, decreasing to 2 or 1 row behind; whilst the vomer has only a single row across it. *Fins*—spinous first dorsal in the young appears in a rudimentary form, becoming absorbed as age advances: the second dorsal commences at the most elevated point of the back; its rays, especially the first 7 or 8, are elongated and have filiform terminations. Pectoral rather longer than the head. Ventral with its two outer rays elongate in the young, not so in the adult. The preanal spines are apparent in the immature. First two or three anal rays elongate, but not so much so as those of the dorsal fin. Caudal deeply forked. *Scales*—rudimentary or absent except along the lateral line; at the free portion of the tail they are keeled, anteriorly they are small and rounded. A low keel on either side of base of tail in adults. *Lateral line*—first ascends, then curves to below the 12th dorsal ray, when it becomes straight. *Pyloric appendages*—numerous. *Colour*—silvery glossed with purple and gold: the young with five wide vertical bands which disappear with age. A small, dark opercular spot in the adult. Filamentous prolongations of fins dark or black.

Hab. Red Sea, seas of India, Malay Archipelago and beyond; attaining at least 2 feet in length (said to reach 5 feet) and not uncommon.

930. (23.) Caranx ciliaris.

Zeus ciliaris, *Bloch, Ich.* t. 191.
Caranx ciliaris, *Day, Fish. India,* p. 224 (see synon.).

D. 6 | 1/19. P. 18. A. 2 | 1/16. C. 19. Sc. l. 15.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $1\frac{1}{2}$ to $1\frac{3}{4}$ in the total length. *Eyes*—without adipose lids; diameter 3 in length of head,

$\frac{3}{4}$ to 1 diam. from end of snout. Body elevated and compressed, a swelling in dorsal profile opposite eyes, causing a slight concavity below and also above them. Lower jaw the longer; maxilla reaches to below front edge or first third of eye. Greatest height of preorbital from $\frac{3}{4}$ to 1 diameter of the orbit. *Teeth*—villiform in jaws, vomer, palatines, and tongue. *Fins*—spinous first dorsal rudimentary; the second dorsal commencing at the most elevated point of the back; first five or six rays elongate and with filiform terminations. Pectoral as long as head. Ventral reaches anal. Anterior rays of anal elongate like those of second dorsal. Caudal deeply forked. *Scales*—absent except on the lateral line. *Lateral line*—with a strong bend anteriorly, becoming straight below the ninth or tenth dorsal ray. *Colour*—silvery, with five or six vertical bands on the body. Anterior portion of soft dorsal and anal black. An opercular spot.

Hab. From the Red Sea, through the seas of India to the Malay Archipelago and beyond. This species is not nearly so common as *C. gallus*.

931. (24.) Caranx leptolepis.

Caranx leptolepis, *Cuv. & Val. H. N. Poiss.* ix, p. 63; *Day, Fish. India,* p. 225, pl. li, fig. 4 (see synon.).

Ramah parah, Tam.

D. 8 | 1/24–26. P. 20. A. 2 | 1/21. C. 17. Sc. l. 24–28.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{2}{3}$ to $4\frac{1}{4}$ in the total length. *Eyes*—with broad posterior adipose lids covering hind third of pupil, an anterior eyelid extending half across iris; diameter $3\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Jaws of about the same length, or lower slightly longer; maxilla reaches to below anterior edge or first third of orbit. Preorbital in its deepest part equals $\frac{2}{3}$ diameter of orbit. *Teeth*—fine in anterior portion of lower jaw, none in the upper jaw, vomer, or palate; a fine band on the tongue. *Fins*—dorsal spines weak, third and fourth longest and $\frac{1}{2}$ height of body; anterior portion of soft dorsal highest and $\frac{3}{7}$ height of body. Pectoral rather longer than head and reaching to above the fourth anal ray; ventral nearly reaches the preanal spines. Last dorsal and anal ray somewhat elongate. *Scales*—over body, chest, cheeks, and superiorly on the head to above middle of eye. *Lateral line*—95 scales; it makes a very gentle curve, becoming straight below the first third of second dorsal; keeled scales begin so gradually under the last portion of second dorsal that it is difficult to decide where they commence, the longest are below commencement of free portion of the tail, and about $\frac{1}{14}$ height of body. *Colour*—silvery, a broad golden stripe from above eye to upper edge of tail; lower two thirds of dorsal fin yellow, upper third dark. Outer third of anal white, the rest yellow: a large deep black spot on the shoulder, said to be sometimes absent (*C. mertensii*).

Hab. Seas of India to the Malay Archipelago and Australia.

932. (25.) Caranx nigripinnis.

Caranx nigripinnis, *Day, Fish. India*, p. 225, pl. li, fig. 5 (see synon.).

D. 7–8 | 1/23–28. P. 23. A. 2 | 1/20–22. C. 19. Sc. l. 55–60.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—with wide anterior and posterior adipose lids (in one specimen with only a very broad posterior one); diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{3}$ apart. Dorsal and abdominal profiles about equally convex. Snout and lower jaw rather broad and rounded, the width of gape being rather more than the depth of the cleft; lower jaw somewhat the longer; the maxilla reaching to below the front edge of eye. Greatest depth of preorbital equals $\frac{2}{3}$ of diameter of orbit. *Teeth*—in both jaws in a single row of equal size, none on the vomer or palate, some on the tongue. *Fins*—dorsal spines of moderate strength, third longest, from $\frac{3}{8}$ to $\frac{1}{2}$ height of body, and from $\frac{1}{4}$ shorter than to as long as the first rays; last dorsal ray thickened but not prolonged. Pectoral falciform, and from as long as the head to slightly longer. Caudal rather deeply forked. *Scales*—over body, chest, behind the eyes, and on the upper portion of the opercles. No sheath to soft dorsal and anal fins. *Lateral line*—105 scales; moderately curved in front and becoming straight below the fourth or fifth dorsal rays, where the plates commence; they soon become pretty well developed, the depth of the largest equalling from $\frac{1}{11}$ to $\frac{1}{13}$ of that of the body. *Colour*—silvery, shot with gold: first dorsal deep black, anal with a white edge. A wide dark band along the second dorsal; its upper anterior corner white.

Hab. Madras and Andamans.

933. (26.) Caranx speciosus.

Scomber speciosus *(Forsk.)*, *Gmel. Syst. Nat.* p. 1332.
Caranx speciosus, *Day, Fish. India*, p. 226, *Suppl.* p. 789 (see synon.).

Poloosoo parah, Tel.; *Pathi parah* and *Pilli parah*, Tam.; *Nga wen*, Arracan.

D. 7–8 | 1/18–20. P. 22. V. 1/5. A. 2 | 1/15–16. C. 19. Sc. l. 13–15.

Length of head $4\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—in middle of depth of head, without adipose lids, but the skin extends slightly over the edge of the eye all round; diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout. Body oval and strongly compressed. Interorbital space much elevated, having a crest along its middle. Jaws of equal length; maxilla reaches to below first third or middle of orbit. Greatest depth of preorbital equals 1 diameter of eye. Pre-, sub-, and interopercles finely serrated in the young, crenulated or entire in adults. *Teeth*—absent from jaws and palate. *Fins*—spines of first dorsal weak, third or highest $\frac{1}{4}$ height of body; interspinous membrane rather deeply emarginate; the recumbent spine anterior to the fin is very distinct in

the young. Anterior portion of second dorsal highest, decreasing to ninth ray, whence it remains the same height; anterior rays $\frac{3}{7}$ height of body, upper edge of fin emarginate. Pectoral falcate, longer than head, and reaching to beneath the eleventh dorsal ray. Second free anal spine longest. Anal fin commences on the vertical below fifth dorsal ray and is of similar form to second dorsal. *Scales*—small, some on cheeks, upper edge of opercle, and to above the hind third of the eye, none on the interorbital crest. Body and chest scaled. *Lateral line*—about 106 scales, the first portion to below the sixth or eighth dorsal ray forms a long curve, from thence it proceeds direct to the centre of the tail; in the first portion of its straight course the plates are small, the last thirteen to fifteen are pretty well developed and about $\frac{1}{15}$ the height of the body. *Colour*—golden, with vertical black bands alternately narrow and wide, from dorsal to ventral surface. The first wide band descends obliquely through eye; on the body are five more wide bands, the first over the shoulder touching the hind edge of the opercle, and the last over the free portion of the tail. Dorsal fin minutely dotted with fine black points; upper edge of soft dorsal grey, end of caudal lobes black; anal golden. Adults are said to become of a uniform colour, a statement I have not been able to verify.

Hab. Red Sea, throughout the seas of India to the Malay Archipelago and Australia; attaining at least 3 feet in length, and at this size I have found the colours to be still distinct.

2. Genus **MICROPTERYX**, Agass.

Syn. *Seriola*, sp., Cuv.; *Chloroscombrus*, Gir.; *Micropus*, Kner (not Gray).

Branchiostegals seven. Body compressed; abdomen prominent and trenchant. Gape of mouth rather small. Teeth feeble, present on vomer and palatines. Two dorsal fins, the first with 7 spines, and a recumbent, anteriorly directed one in front of the base of the fin; the second and the anal considerably more developed and without finlets posteriorly; two preanal spines. Scales small. Lateral line smooth. Air-bladder bifurcated posteriorly. Pyloric appendages in moderate numbers.

934. (1.) **Micropteryx chrysurus.**

Scomber chrysurus, *Linn. Syst. Nat.* i, p. 494.
Micropteryx chrysurus, *Day, Fish. India*, p. 227 (see synon.).

D. 7 | 1/26–28. P. 18. A. 2 | 1/25–26. Cæc. pyl. 10–15.

Length of head $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Abdominal more convex than dorsal profile. Cleft of mouth almost vertical, it commences opposite upper edge of orbit; the lower jaw the longer and its end forming part of the dorsal profile when the mouth is closed; the maxilla reaches to

below the first third of the eye. *Fins*—dorsal spines weak, increasing in length to the third, which is nearly as high as anterior portion of soft dorsal, and $\frac{1}{5}$ height of body. Pectoral falciform and $\frac{2}{7}$ to $\frac{4}{15}$ of total length. Ventral short and equal to $\frac{1}{5}$ height of body. Anal similar to second dorsal. Caudal forked. *Scales*—small, present behind the eyes and over the body, also forming a sheath for bases of dorsal and anal fins. *Lateral line*—forms rather a deep curve in the first third of its course. *Colour*—greenish along the back, becoming silvery on the sides and beneath. A dark blotch over the free portion of the tail. Ventrals white.

Hab. This fish frequents the west coast of Africa and the Atlantic coasts of America; it has also been captured at Pondicherry.

3. Genus **SERIOLA**, Cuv.

Branchiostegals seven; pseudobranchiæ. Body oblong and moderately compressed; abdomen rounded. Cleft of mouth sometimes deep. Preopercle entire. Villiform teeth in the jaws, vomer, and palatine bones. First dorsal fin continuous, its spines not strong, the second dorsal and anal with many more rays; as a rule a pair of preanal spines, remote from the rest of the fin. Scales small or rudimentary. Lateral line unarmed. Air-bladder simple. Pyloric appendages many.

Geographical Distribution. Nearly all temperate and tropical seas.

935. (1.) Seriola nigrofasciata. (Fig. 57.)

Nomeus nigrofasciatus, *Rüppell, Atl. Fische*, p. 92, t. xxiv, fig. 2.
Seriola nigrofasciata, *Day, Fish. India*, p. 227, pl. li, fig. 6 (see synon.).

D. 5-6 | 1/29-33. P. 19. A. 1/15-17. C. 19.

Length of head from $3\frac{2}{3}$ in the young to $4\frac{1}{2}$ in the adult, height

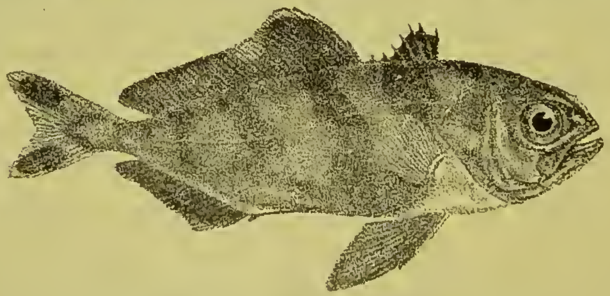

Fig. 57.—*Seriola nigrofasciata.*

of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout. Dorsal profile more convex than abdominal; snout rather obtuse; abdomen broad. Lower

jaw rather the longer. *Fins*—first dorsal spines weak, low, from $\frac{1}{3}$ to $\frac{1}{2}$ height of second dorsal, the anterior portion of which latter is from $\frac{1}{2}$ to $\frac{2}{3}$ height of body. Anal commences below the middle of the soft dorsal. Caudal forked. *Scales*—minute. *Colour*—bluish grey, with five black bands obliquely directed forwards from the back down the body; one or two similar but narrower bands on the head. First dorsal fin black, second dorsal dark, becoming black near its summit and with a white tip. Pectoral yellow. Ventral and anal black, the latter with a white tip. Caudal yellowish, the young having a black blotch in the last portion of each caudal lobe.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

4. Genus SERIOLICHTHYS, Bleeker.

Syn. *Decaptus*, Poey.

Branchiostegals seven. Body oblong, compressed; abdomen rounded. Cleft of mouth of moderate depth. Preopercle slightly crenulated or entire. Villiform teeth on the jaws, vomer, palatines, and tongue. First dorsal fin continuous, the second and the anal with many more rays, and each having one or two finlets posteriorly; a pair of preanal spines remote from the rest of the fin may be present or absent. Scales cycloid, small. Lateral line unarmed.

936. (1.) Seriolichthys bipinnulatus. (Fig. 58.)

Seriola bipinnulata, *Quoy & Gaim. Voy. Uranie et Phys. Zool.* i, p. 363, pl. 61, fig. 3.
Seriolichthys bipinnulatus, *Bleeker, Batavia Nat. Tijdsch.* vi p. 196; *Day, Fish. India*, p. 228, pl. li A, fig. 1, *Suppl.* p. 789 (see synon.).

Kulul and *Poonkolal*, Tam.

D.5 | 1/24-25+i. P.21. A.0-2 | 1-2/16-17+i. L.l.95. L.tr.16/28.

Length of head 5, height of body 5 in the total length. *Eyes*—

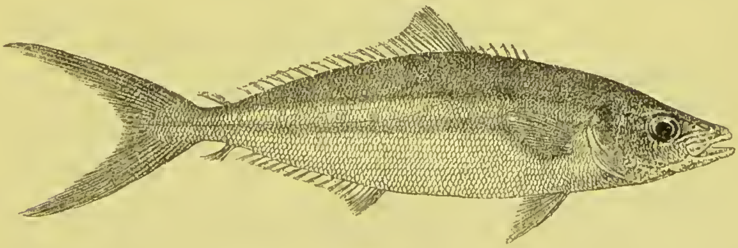

Fig. 58.—*Seriolichthys bipinnulatus.*

diameter 4 in length of head, $1\frac{1}{4}$ diam. from ond of snout and also

apart. Body elongate and compressed, its greatest height opposite origin of soft dorsal. Lower jaw slightly the longer, gape of mouth rather narrow. Gill-openings cleft forwards to below anterior edge of orbit. *Fins*—dorsal spines of moderate strength, low, with the interspinous membrane deeply cleft. Anterior portion of second dorsal highest, equalling $\frac{2}{5}$ of body; at a short distance behind this fin are two rays placed close together and forming a finlet; they are rather elongate and reach the root of the caudal fin. Pectoral short, $\frac{1}{9}$ of the total length. Anal of the same form but anteriorly lower than the soft dorsal, being $\frac{2}{7}$ of the height of the body; it has similarly a posterior finlet. Caudal deeply forked. *Scales*—on cheeks, upper edge of opercles, behind the eyes, and over the body. *Colour*—two longitudinal blue bands pass from the eye, the upper to the dorsal finlet, and the lower to the centre of the base of the caudal fin.

Hab. Red Sea; from the east coast of Africa, through the seas of India, to the Malay Archipelago and beyond. This fish attains several feet in length.

5. Genus **NAUCRATES**, Cuv.

Syn. *Nauclerus*, Cuv. & Val. (young).

Branchiostegals seven. Body oblong, subcylindrical. Cleft of mouth moderate. In the very young there is a spine at the angle of the preopercle, which becomes absorbed as age advances. Villiform teeth in the jaws, vomer, and palatine bones. The first dorsal fin, which is continuous in the young, becomes reduced to a few spines in the adult; the second dorsal and anal with many rays; no spurious fins; in the young two preanal spines remote from the soft fin, these become lost with age. Scales small; lateral line unarmed; a keel on either side of the tail. Air-bladder present. Pyloric appendages in moderate numbers.

Geographical Distribution. These "pilot fishes" are spread through all the seas of temperate and tropical regions. Most travellers in sailing vessels have seen them as close attendants upon sharks, leading them, as the sailors consider, to their prey.

937. (1.) **Naucrates ductor.** (Fig. 59.)

Gasterosteus ductor, *Linn. Syst. Nat.* i, p. 489.
Naucrates ductor, *Day, Fish. India*, p. 229, pl. li A, fig. 2 (see synon.).

D. 3–6 | 1/26–28. A. 0–2 | 2/16–17. Cæc. pyl. 12–15. Vert. 10/16.

Length of head 4 to $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout. *Fins*—first dorsal fin short, second dorsal highest anteriorly, anal commences under the middle of the second dorsal. Pectoral as long as the ventral, which reaches $\frac{2}{5}$ of way to base of

the anal. *Scales*—cycloid. *Lateral line*—a little raised on the side of the tail. *Colour*—bluish, with five or six dark vertical bands; caudal sometimes with the ends of the lobes white, and

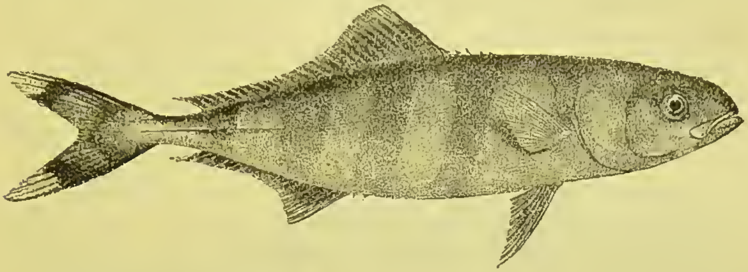

Fig. 59.—*Naucrates ductor.*

having a dark band across their last third. Basal half of anal and centre of dorsal dark grey.

Hab. Seas of temperate and tropical regions.

6. Genus **CHORINEMUS**, Cuv. & Val.

Syn. *Scomberoides,* Lacép.

Branchiostegals seven or eight; pseudobranchiæ. Body oblong and compressed. Eyes lateral. Cleft of mouth moderate or deep. Teeth in jaws, also present on vomer, palatines, and tongue. Two dorsal fins, the first (preceded by an immovable, recumbent spine, directed forwards) has a groove at its base for its reception; it is formed by a few free spines, fewer in number than the rays of the second dorsal or anal, the posterior rays of both of which are either detached or semi-detached; a pair of preanal spines separated by an interspace from the remainder of the fin. Dermal scales mostly lanceolate. Lateral line continuous, not keeled. Air-bladder bifurcated posteriorly. Pyloric appendages numerous.

Geographical Distribution. Indian Ocean and tropical parts of the Atlantic.

Synopsis of Indian Species.

A. Dorsal spines flattened, the end of each does not reach base of next in adults; height of body $4\frac{1}{4}$ to $4\frac{2}{3}$ in total length .... 1. *C. sancti-petri*, p. 174.

B. Each dorsal spine overlaps the next.

- Height of body $5\frac{1}{4}$ in total length .... 2. *C. moadetta*, p. 174.
- Height $3\frac{1}{2}$ to 4 in length. No canines .. 3. *C. lysan*, p. 175.
- Height $3\frac{2}{3}$ in length. Distinct canines in both jaws .... 4. *C. tala*, p. 176.
- Height $3\frac{1}{2}$ to $3\frac{2}{3}$ in length. No canines in upper jaw .... 5. *C. toloo*, p. 176.

938. (1.) Chorinemus sancti-petri.

Chorinemus sancti-petri, *Cuv. & Val. H. N. Poiss.* viii, p. 379, pl. 236; *Day, Fish. India*, p. 230, *Suppl.* p. 789 (see synon.).

Nga moozin, Arracan.

B. viii. D. 7 | 1/19–21. P. 17. A. 2 | 1/18–19. C. 15.

Length of head $5\frac{1}{4}$ to $5\frac{3}{4}$, of pectoral $4\frac{1}{2}$, of caudal $4\frac{1}{2}$, height of body $4\frac{1}{4}$ to $4\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout and also apart. Profile above orbit slightly concave. Maxilla concealed by the preorbital except in the last third of its course. Central longitudinal crest on the skull scarcely elevated. Angle of preopercle slightly produced. *Teeth*—several villiform rows anteriorly in both jaws, a single one in last $\frac{2}{3}$ of premaxillaries; two rows in lower jaw; a triangular patch, elongate posteriorly, on the vomer; a pyriform band, largest anteriorly, on the palatines, and also on the tongue. *Fins*—spines of first dorsal flattened, laterally expanded into a lanceolate form, and keeled along their centre; in the adult each spine does not extend so far as the base of the next before it, but they slightly overlap in the young. First portion of second dorsal elevated, $\frac{4}{9}$ height of body, and $\frac{1}{5}$ higher than commencement of anal. Caudal deeply lobed. *Scales*—exposed portions of each lanceolate and pointed, with a line along the middle and the posterior part depressed, behind the exposed lanceolate portion each scale ends in a narrow pedicle rather more than half its entire length. In the young the scales are not quite so pointed, and when removed appear much like a spoon. *Lateral line*—makes an obtuse angle opposite middle of pectoral fin, thence it gradually slopes downwards, becoming straight beneath the first dorsal ray. *Colour*—a bluish-grey spot on the opercle, and a row of from six to eight dark blotches above the lateral line; sometimes, more especially in the adult, a second row beneath it. Summit of soft dorsal black.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond; attaining at least 20 inches in length.

939. (2.) Chorinemus moadetta. (Fig. 60.)

Chorinemus moadetta, *Cuv. & Val. H. N. Poiss.* viii, p. 382; *Day, Fish. India*, p. 230, pl. li B, fig. 1, *Suppl.* p. 789 (see synon.).

B. viii. D. 7 | 1/21. P. 19. A. 2 | 1/18–19. C. 17.

Length of head $5\frac{2}{3}$ to $5\frac{3}{4}$, of caudal $6\frac{1}{2}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{4}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Dorsal profile rather concave above the orbits, the central and lateral ridges on the summit of the head well developed. The lower jaw somewhat the longer, maxilla uncovered from beneath first third of eyes. *Teeth*—in the premaxillaries in a single row, the two anterior teeth large and rather canine-like; teeth in the lower jaw in two rows, the outer

of which is curved rather outwards and upwards, some are enlarged on either side of the symphysis; a longitudinally elongate ovate patch on the vomer; a long pyriform band on the palate, largest anteriorly, also on the tongue. *Fins*—dorsal spines rounded, not flattened, overlapping and twisting laterally when elevated; first portion of second dorsal highest, $\frac{3}{7}$ height of body, and $\frac{1}{3}$ higher than first part of anal. Pectoral as long as head behind middle of eye. Caudal deeply forked. *Scales*—peculiar, resembling needles sharp at both ends, lying close together and interdigitating; it is

Fig. 60.—*Chorinemus moadetta.*

only near the free portion of the tail that they become at all scale-like. *Lateral line*—rather indistinct and almost straight, making one slight angular elevation above last third of pectoral. *Colour*—silvery along the upper third of the body, becoming white on the sides and below; a series of six or eight blotches along the sides, mostly above the lateral line. A black blotch at the highest point of the second dorsal and at the end of either lobe of the caudal, the other fins yellow.

Hab. Red Sea, east coast of Africa, and seas of India; attaining upwards of 15 inches in length. As food its flesh is dry and tasteless.

940. (3.) Chorinemus lysan.

Scomber lysan, *Forsk. Descr. Anim.* p. 54, no. 69.
Chorinemus lysan, *Cuv. & Val. H. N. Poiss.* viii, p. 387; *Day, Fish. India*, p. 231, *Suppl.* p. 789 (see synon.).

Toal parah, Tam.; *Parah*, Hind.; *Nga khumba*, Arracan.; *Mattia mach*, Chittagong.

B. viii. D. 7 | 1/19–20. P. 19. A. 2 | 1/17–18. C. 19. Vert. 10/16.

Length of head $5\frac{1}{2}$ to 6, of caudal $4\frac{1}{2}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and rather above 1 apart. Body rather strongly compressed, profile over nape slightly concave. Cleft of mouth deep; the maxilla, which extends nearly half a diameter behind the orbit, is narrow and uncovered by the preorbital from beneath first third of eye. *Teeth*—anteriorly in two rows, posteriorly in one in the premaxillaries; in two rows in the lower jaw, the outer directed outwards and upwards in the young; some of the anterior teeth

in both jaws are rather enlarged: a triangular spot rather prolonged posteriorly in the vomer; a pyriform band, largest anteriorly, on the palatines, also on the tongue. *Fins*—anterior portions of soft dorsal and anal elevated, $\frac{4}{5}$ of length of head; the last 8 or 10 rays semi-detached, the last rather elongate. Caudal deeply forked. *Scales*—distinct and lanceolate. *Lateral line*—has a slight angular elevation soon after its eommeneement. *Colour*—six to eight large, round, grey spots like finger-marks on the side, the lateral line sometimes going through the first two, while the others are all above it; summit of soft dorsal black.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining to 3 feet or more in length.

941. (4.) Chorinemus tala.

Chorinemus tala, *Cuv. & Val. H. N. Poiss.* viii, p. 377; *Day, Fish. India,* p. 231 (see synon.).

B. viii. D. 7 | 1/20. P. 19. A. 2 | 1/17. C. 17.

Length of head $5\frac{3}{4}$, of caudal $4\frac{3}{4}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal and abdominal profiles equally eonvex. Lower jaw prominent; maxilla uncovered from below middle of eye. Posterior limb of preoperele nearly vertical, and its angle not produced. *Teeth*—two strong eanines directed a little outwards at the symphysis in either premaxillary, and several villiform rows behind them, laterally a single row of rather distantly placed pointed teeth; in the lower jaw at the symphysis are two canines anteriorly pointed a little forward, posteriorly two more directed upwards; laterally two rows of teeth, the inner considerably the larger; a quadrangular patch on the vomer; a pyriform band, larger anteriorly on the palatines, and also on the tongue. *Fins*—dorsal spines overlapping and twisting slightly laterally when elevated; first portion of second dorsal $\frac{5}{11}$ height of body, $\frac{1}{5}$ longer than anterior part of anal. Peetoral as long as head without snout. Caudal deeply forked. *Seales*—rhomboidal, and more or less pointed posteriorly, on being removed the outer half is found to be lanceolate, the posterior more contracted. *Lateral line*—becomes straight below the middle dorsal spine, it has an angular elevation above last $\frac{2}{3}$ of pectoral. *Colour*—leaden silvery in upper third of back, silvery white on the sides and below; a series of seven spots above the middle of the sides, the first two being intersected by the lateral line. Summit of second dorsal blaek.

Hab. Seas of India; attaining at least $6\frac{1}{2}$ inches in length.

942. (5.) Chorinemus toloo.

Chorinemus toloo, *Cuv. & Val. H. N. Poiss.* viii, p. 377; *Day, Fish. India,* p. 232, pl. li A, fig. 3 (see synon.).

Falai, Maráthi.

B. viii. D. 7 | 1/19–20. P. 20. A. 2 | 1/17–18. C. 19.

Length of head $5\frac{2}{3}$, of pectoral 8 to $8\frac{1}{2}$, of caudal $4\frac{1}{2}$ to 5, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Body elliptical, compressed; upper jaw only uncovered in the last third of its extent. Preorbital narrow, but covering the first $\frac{2}{3}$ of the maxilla; preopercle narrow, having its angle rounded and produced. Central crest of skull distinct. *Teeth*—comparatively large, in a single row in the upper jaw and in two in the lower, the outer of the latter directed somewhat outwards; there are two canine-like teeth on either side of symphysis of lower jaw; a triangular patch on the vomer; an elongate pyriform band, largest anteriorly, on the palatines, and on the tongue. *Fins*—the anterior portion of the soft dorsal elevated, similar to the anal, and $\frac{1}{2}$ height of body; the posterior 8 or 10 rays of either fin semi-detached, and the last rather elongate. Caudal deeply forked. *Scales*—small but distinct, and lanceolate in their exposed portion. *Lateral line*—has a very slightly raised angle in the first part of its course, but its general direction is straight. *Colour*—greenish tinge along back shot with blue, becoming dull silvery below lateral line. Six or eight moderately sized, oval, and indistinct vertical spots or blotches on the side, usually intersected by the lateral line. Vertical fins darkish.

Hab. Seas of India; said to attain 18 inches in length.

7. Genus **TRACHYNOTUS** (Lacép.), Cuv. & Val.

Syn. *Acanthinion* and *Cæsiomorus*, Lacép.

Cultalli, Tamil.

Branchiostegals seven; pseudobranchiæ absent. Body compressed, more or less elevated, with the frontal region prominent. Eyes lateral. Snout obtuse and swollen; cleft of mouth small. Teeth on the jaws, vomer, and palatines, usually lost with age. Two dorsal fins, the first composed of spines having a small connecting membrane (receivable into a groove at their base), and a horizontal spine, directed forwards, anterior to the fin; rays of second dorsal and of anal more numerous than the spines in the first dorsal; anterior portion of the second dorsal and anal pointed and elongate; two preanal spines separated by an interspace from the remainder of the fin; no finlets. Scales small. Lateral line unarmed. An air-bladder bifurcated posteriorly. Pyloric appendages varying in number.

Geographical Distribution. Indian, Pacific, and Atlantic Oceans, within the tropics.

Synopsis of Indian Species.

Height of body not exceeding $\frac{1}{3}$ of total length.
- Ventrals very small; small black spots on l. l. . . 1. *T. baillonii*, p. 178.
- Ventrals moderate; large dark blotches above l. l. 2. *T. russellii*, p. 178.

Height of body much exceeding $\frac{1}{3}$ of total length; no spots or blotches . . . . 3. *T. ovatus*, p. 179.

943. (1.) Trachynotus baillonii.

Cæsiomorus baillonii, *Lacép. H. N. Poiss.* iii, p. 93, pl. 3, fig. 1.
Trachynotus bailloni, *Day, Fish. India,* p. 233, pl. li A, fig. 4 (see synon.).

Vella oodoo and *Parruvu,* Mal.; *Mookalee,* Tamil; *Nga moozin,* Arracan.

D. 6–7 | 1/22–24. A. 2 | 1/22–24. C. 19. Cæe. pyl. 12. Vert. 9/12.

Length of head $5\frac{1}{3}$ to $5\frac{1}{2}$, of caudal fin $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal spines moderately strong; second dorsal and anal very much produeed in front, and if laid baekwards the first dorsal rays reach to nearly the end of that fin, those of the anal to its posterior extremity. Ventral small, equalling $1\frac{1}{2}$ diameters of the orbit. Caudal deeply forked, lobes long, the upper slightly the longer. *Scales*—small, plaeed in sinuous lines. *Lateral line*—nearly straight. *Colour*—upper surface of head and baek silvery yellowish green, beeoming lighter on the sides, and silvery white on the abdomen, opercles, and eheeks. Lobes of dorsal, anal, and eaudal black, some white likewise on those of the tail; a row of three to five deep blaek spots along the lateral line.

Hab. Red Sea, east eoast of Afriea, seas of India to the Malay Archipelago; it attains at least 20 inehes in length.

944. (2.) Trachynotus russellii. (Fig. 61.)

Trachynotus russellii, *Cuv. & Val. H. N. Poiss.* viii, p. 436; *Day, Fish. India,* p. 233, pl. li B, fig. 3, *Suppl.* p. 790 (see synon.).

D. 6 | 1/22–23. P. 17. A. 2 | 1/20–21. C. 17.

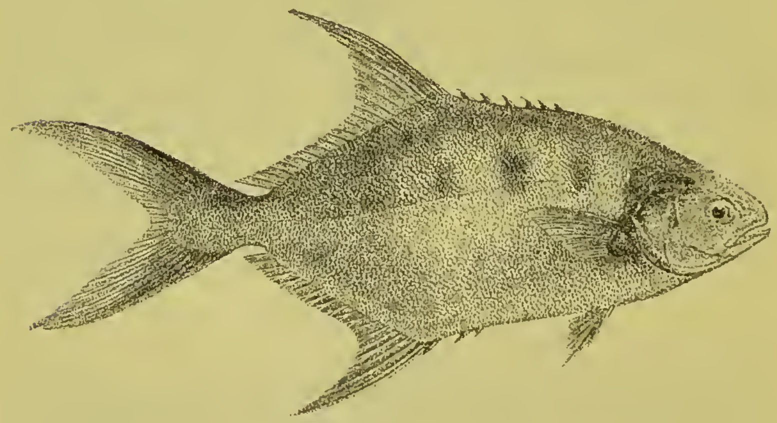

Fig. 61.—*Trachynotus russellii.*

Length of head 5 to $5\frac{3}{4}$, of caudal fin 4 to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, about 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal and abdominal profiles about equally convex, snout obtuse. Central longitudinal crest on the head well developed. *Fins*—spines of first dorsal of moderate strength; anterior rays of second dorsal prolonged, $\frac{2}{3}$ to $\frac{3}{4}$ as long as base of fin, and similar to those of the anal. Ventrals as long as postorbital portion of head in adults; rather longer in young, they reach above halfway to anal in young, but are not quite so long in adults. Caudal deeply forked. *Scales*—in irregular rows, small. *Lateral line*—nearly straight. *Colour*—greenish, dashed with yellow on the back, becoming more golden on the sides and beneath; usually a dark blotch at upper margin of opercle and commencement of lateral line. From 3 to 5 large, dull, rounded blotches a little distance above the lateral line; these often disappear after death; they are much darker and more persistent in the adult than in the young; elongated portions of dorsal and anal fins, also lobes of caudal, orange stained with black.

Hab. Seas of India to the Malay Archipelago and Australasia. Not uncommon at Madras, my largest specimen being 22 inches long, from Canara.

945. (3.) Trachynotus ovatus.

Gasterosteus ovatus, *Linn. Syst. Nat.* i, p. 490.
Trachynotus ovatus, *Day, Fish. India*, p. 234, pl. li B, fig. 2, *Suppl.* p. 790 (see synon.)

Katáttitaka, Maráthi; *Kootili*, Tamil; *Roojana*, Arracan.

D. 6–7 | 1/18–21. P. 17. A. 2 | 1/16–19. C. 17. Cæc. pyl. 12.

Length of head $4\frac{1}{2}$, of caudal fin 4, height of body 2 to $2\frac{1}{3}$ in the total length. *Eyes*—in the middle of height of head, diameter 3 to $4\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. (in the young) to $1\frac{1}{4}$ (in the adult) from end of snout, and $1\frac{1}{4}$ apart. Body elliptical and compressed, snout very obtuse; a considerable rise to the first dorsal, but superior and inferior profiles of body equally convex. Mouth oblique. *Teeth*—in young specimens a band of card-like teeth in both jaws, but as the fish increases in size (eight inches in length) they disappear, as well as those on the vomer and palatine bones. *Fins*—second dorsal having its first ray highest, $\frac{1}{2}$ height of body. Ventrals in the young as long as the head behind the middle of the eyes. Caudal with deep lobes. *Scales*—minute. *Lateral line*—at first very slightly ascends, and then forms a slight curve to opposite the eleventh dorsal ray, whence it proceeds straight to centre of caudal. *Colour*—more or less golden; the upper half of first five dorsal rays tipped with black, and the fin generally dotted with minute black points; sometimes the anal and caudal are similarly marked; first three quarters of pectoral grey, last fourth yellow.

Hab. Indian and Atlantic Oceans; attaining at least 20 inches in length. This fish salts well, but when fresh is dry and insipid.

8. Genus PSETTUS (Comm.), Cuv. & Val.

Syn. *Monodactylus*, Lacép.

Branchiostegals six; pseudobranchiæ. Body much compressed and elevated. Eyes lateral. Cleft of mouth small, snout short. Teeth villiform on jaws, vomer, palatine bones, and tongue. A single dorsal fin with seven or eight spines; anal with three, continuous with the rest of the fin; ventrals rudimentary. Scales small, covering the vertical fins. Lateral line unarmed. Air-bladder present, bifurcated posteriorly. Cæcal appendages numerous.

Geographical Distribution. Indian, Pacific, and Atlantic Oceans, within the tropics.

Synopsis of Indian Species.

Height of body $\frac{6}{13}$ to $\frac{1}{2}$ total length. No bands. 1. *P. falciformis*, p. 180.
Height of body $\frac{2}{3}$ total length. A black ocular band and a second just behind head...... 2. *P. argenteus*, p. 180.

946. (1.) Psettus falciformis.

Monodactylus falciformis, *Lacép. H. N. Poiss.* iii. pp. 131, 132.
Psettus falciformis, *Day, Fish. India*, p. 234, pl. li A, fig. 6 (see synon.).

Purrandee, Mal.

D. 8/28–30. P. 16. V. 1/3–5. A. 3/29. C. 17. L. l. 100.

Length of head 4 to $4\frac{1}{3}$, height of body 2 to $2\frac{1}{6}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Cleft of mouth oblique. Angle of preopercle rounded and finely serrated. *Fins*—dorsal spines nearly concealed, anterior rays elongate. Pectoral $\frac{2}{3}$ as long as head. Ventrals placed close together like two spines, the rays being minute. Anal of the same form as the dorsal, its anterior portion as high as the head is long. Caudal rather deeply emarginate. *Scales*—about 120 rows descend to the lateral line. *Lateral line*—forms a long arch, becoming straight on free portion of the tail. *Colour*—silvery, soft dorsal and anal tinged with black.

Hab. Red Sea, seas of India and beyond; attaining at least 9 inches in length.

947. (2.) Psettus argenteus. (Fig. 62.)

Chætodon argenteus, *Linn. Syst. Nat.* p. 461.
Psettus argenteus, *Day, Fish. India*, p. 235, pl. li B, fig. 5 (see synon.).

Nga-pus-soond, Mugh.; *Oo-chra-dah*, Andam.

D. 8/28–30. P. 17. V. 1/2–3. A. 3/28–30. C. 17. L. r. 105/75.

Length of head 4 to $4\frac{1}{3}$, height of body $1\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{3}$ in length of head, $\frac{1}{3}$ diam. from end of snout, and 1 apart. Cleft of mouth oblique, lower jaw the longer. Angle of opercle rather angular and finely serrated. *Fins*—anterior

dorsal rays elevated, $\frac{1}{5}$ more than those of anal. Pectoral as long as the head excluding the snout. Ventrals placed close together like two spines, the rays being minute. Anterior anal rays as long as the head. Caudal emarginate. *Lateral line*—makes a long, low curve, becoming straight nearly below last fourth of dorsal. *Colour*—silvery, with purplish reflexions, especially about the anal fin:

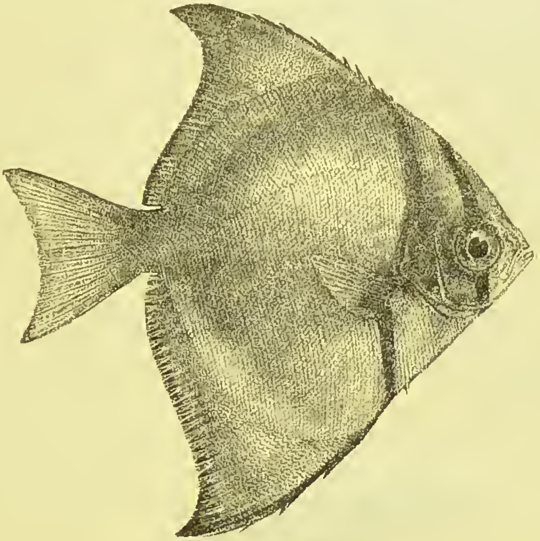

Fig. 62.—*Psettus argenteus.*

the back is yellowish green, which after death rapidly assumes a leaden hue. One rather wide black band passes directly downwards from the nape through the centre of the eye; a second from opposite the first three dorsal spines goes as far as the opercle. Part of the dorsal is stained with black, as is also the anterior portion of the anal though to a less extent. Pectoral and ventral colourless; caudal yellow, with a narrow black posterior edge.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, Australia, and Polynesia: attaining at least 7 inches in length. Most common in Malabar during the monsoon months.

9. Genus **PLATAX**, Cuv. & Val.

Branchiostegals six; pseudobranchiæ. Body compressed and much elevated. Eyes lateral. Cleft of mouth small; snout short. Teeth setiform, trilobed at their summits, some present on the vomer. A single dorsal fin with from three to seven spines, which are nearly hidden; anal with three continuous with the rest of the fin; ventrals well developed. Scales ctenoid, of moderate or small size, extended on to the vertical fins. Lateral line unarmed. Air-bladder simple. Pyloric appendages few.

Geographical Distribution. Indian Ocean.

These fishes appear to alter considerably with age, their anterior profile becoming more obtuse and their fins comparatively short.

Synopsis of Indian Species.

D. 5/31–33, A. 3/24–27, L. l. 60–65. Snout obtuse, profile from snout to above eyes vertical. Young with an ocular band as wide as the eye, a second from dorsal spines to between ventral and anal fins; a broad one covers the last half of the back and sides .... 1. *P. teira*, p. 182.

D. 5/35–37, A. 3/26–28, L. l. 55. Snout not quite vertical. Young with a narrow ocular band $\frac{1}{3}$ as wide as eye; a second from dorsal spines to just before anal; another at commencement of free portion of tail .... 2. *P. vespertilio*, p. 183.

948. (1.) Platax teira. (Fig. 63.)

Chætodon teira, *Forsk. Descr. Anim.* p. 60, no. 82.'
Platax teira, *Day, Fish. India*, p. 235, pl. li B, fig. 4. (see synon.).
Kahi sandawa, Teb; *Kavala*, Maráthi.

D. 5/31–33. P. 17. A. 3/24–27. C. 17. L. l. 80–85/60–65/75.

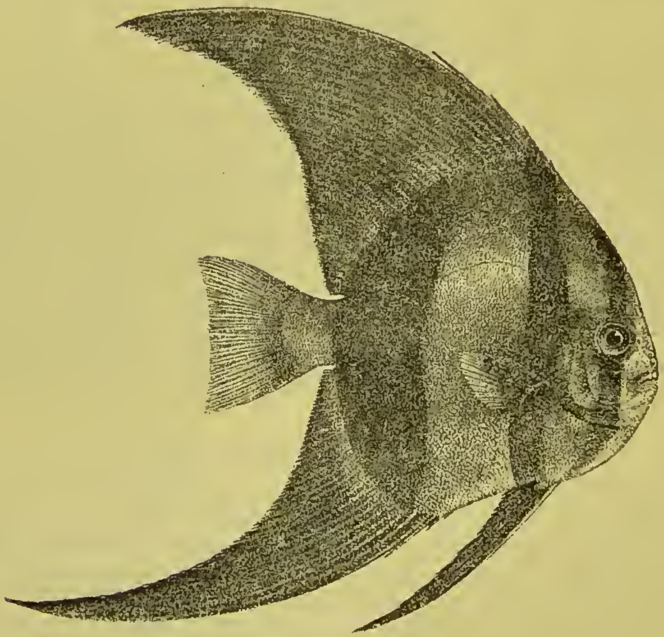

Fig. 63.—*Platax teira.*

Height of body, excluding vertical fins, rather more than, or equal to, its length excluding the caudal fin. *Eyes*—diameter about 3 in

length of head, rather above 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile more convex than abdominal, very obtuse from snout to above the eyes. Angle of preopercle rounded and entire. *Fins*—anterior portions of dorsal and anal very prolonged in young, extending (at 6 inches in length) nearly $\frac{1}{2}$ length of entire fish beyond end of caudal, ventral reaching end of caudal; these fins become comparatively much shorter as age advances. Caudal with its central rays slightly prolonged, making the posterior end of the fin concave in each half. *Colour*—in the *young* greyish, with an ocular band about as wide as the eye passing downwards to the ventral fin; a second from dorsal spines and first rays behind the head, includes base of pectoral, and is lost between ventral and anal; a very broad band passes from the last $\frac{2}{3}$ of dorsal to same part of anal; a narrow band over root of caudal. Fins black, with the exception of the pectoral and ventral, which are yellow except at their bases. The bands disappear with age.

Hab. Red Sea, seas of India, Malay Archipelago and beyond; attaining at least 20 inches in length. Russell says the flavour of this fish is excellent, and Cantor makes the same remark.

949. (2.) Platax vespertilio.

Chætodon vespertilio, *Bloch, Ich.* t. 199, fig. 2.
Platax vespertilio, *Day, Fish. India,* p. 236, pl. li A, fig. 5 (see synon.).

D. 5/35–37. P. 17. V. 1/5. A. 3/26–28. C. 17. L. l. 65/55/60.

Height of body, excluding vertical fins, rather more than its length without the caudal fin. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Dorsal profile more convex than abdominal, not quite vertical from occiput to snout. Angle of preopercle rounded, and its lower edge feebly serrated. *Fins*—the anterior portion of the dorsal fin elevated, its height exceeds the length of its base by about $\frac{1}{3}$ the distance between the snout and its front edge. Ventral reaches to about the middle of the base of the anal fin; anal $\frac{4}{5}$ as high as dorsal. Caudal slightly emarginate. *Lateral line*—the upper curve below base of first dorsal ray is at nearly one third of the height of the body from the back. *Colour*—brownish, fins black, and last two thirds of pectoral yellow. In the *young* there is a narrow ocular band scarcely above $\frac{1}{3}$ the width of the orbit, passing through the eye to the base of the ventral fin; a second, also narrow, from just anterior to the base of the dorsal, descends behind the base of the pectoral towards the anal; a third over commencement of free portion of tail, and occasionally a fourth at base of caudal fin, which is yellow.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

10. Genus **PSENES**, Cuv. & Val.

Branchiostegals six. Body compressed and elevated, with the frontal region swollen. Eyes lateral. Cleft of mouth shallow, with a short snout. A single row of fine teeth in the jaws, none on the palate. Two separate dorsal fins, the first continuous; the second the longer and similar to the anal, which last has two or three spines joined to the soft portion of the fin; no finlets. Lateral line unarmed. Air-bladder bifurcated posteriorly.

Geographical Distribution. Seas of India to the Malay Archipelago and beyond.

Some ichthyologists regard this genus as the type of a distinct family.

Synopsis of Indian Species.

D. 9–10 | 1/24–25, A. 3/24–26, L. l. 55. Leaden colour .... 1. *P. javanicus*, p. 184.
D. 10 | 1/14–15, A. 3/15, L. l. 41–43. Silvery.. 2. *P. indicus*, p. 185.

950. (1.) **Psenes javanicus.** (Fig. 64.)

Psenes javanicus, *Cuv. & Val. H. N. Poiss.* ix, p. 264; *Day, Fish. India*, p. 537, pl. li C, fig. 1, *Suppl.* p. 790 (see synon.).

D.9–10 | 1/24–25. P.19. A.3/24–26. C.17. L.l.55–60. L.tr.15/18.

Length of head 4, height of body 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Dorsal profile elevated, especially above the nostrils. Lower jaw slightly the longer. Cleft of mouth rather oblique. *Teeth*—of comparatively large size, in a single row in each jaw. *Fins*—first dorsal commences above hind edge of opercle, the spines

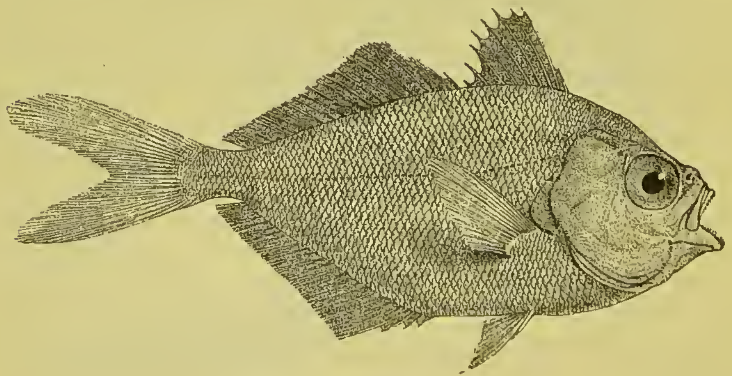

Fig. 64.—*Psenes javanicus.*

are weak, the third longest, $\frac{2}{5}$ height of body, and equal to anterior dorsal rays, the interspinous membrane deeply emarginate. Second

dorsal highest anteriorly, the upper margin rather concave. *Scales*—small and cycloid. *Lateral line*—nearly straight. *Colour*—generally leaden, dorsal and anal fins black. Pectoral yellow. Caudal with a yellowish tinge.

Hab. Seas of India and Malay Archipelago. Not uncommon at Madras, but the largest specimen I obtained (October 1867) was $4\frac{1}{2}$ inches in length.

951. (2.) Psenes indicus.

Cubiceps indicus, *Day, P. Z. S.* 1870, p. 690.
Psenes indicus, *Day, Fish. India*, p. 237, pl. liv, fig. 2 (see synon.).

D. 10 | 1/14–15. P. 23. V. 1/5. A. 3/15. C. 18. L. l. 41–43.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $2\frac{2}{3}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in length of head, $\frac{1}{3}$ to $\frac{1}{2}$ diam. from end of snout, and about 1 apart. Abdominal profile rather more convex than dorsal; snout short. Lower jaw the longer; preopercle entire; opercle ending in a rounded point and spineless. *Fins*—dorsal spines feeble, from the second to the fifth subequal in length, $\frac{1}{3}$ higher than the soft dorsal fin. Pectoral as long as the head excluding the snout. Ventral reaches above halfway to the anal, the spines of which last are low. Caudal deeply forked. *Scales*—very deciduous; some extend on to soft dorsal, anal, and caudal fins. *Lateral line*—on a row of plate-like scales, the tubes branched posteriorly. *Colour*—silvery, with a purplish gloss. Spinous dorsal rather dark in its upper part.

Hab. Madras, where several specimens were captured in the sea (up to $4\frac{1}{2}$ inches in length) during the month of October.

11. Genus **EQUULA**, Cuv. & Val.

Syn. *Leiognathus*, Lacép.

Branchiostegals five or six; pseudobranchiæ. Body oblong, or elevated and strongly compressed. Mouth very protractile. Lower edge of preopercle serrated. Minute teeth of equal size in the jaws, sometimes in a single row; palate edentulous. A single dorsal fin, having fewer spines than rays; anal with 3 spines continuous with the soft portion, which has fewer rays than the soft dorsal; no finlets; ventrals thoracic. Scales small, cycloid, and sometimes deciduous. Lateral line unarmed, usually complete, but in some species ceasing beneath the middle or end of the dorsal fin. Air-bladder terminating anteriorly in two horns. Pyloric appendages few.

The species included in this genus are very similar to each other.

Geographical Distribution. Indian and Pacific Oceans.

Uses. These small fish are extensively sun-dried in India.

Synopsis of Indian Species.

A. Longest dorsal spine not exceeding $\frac{1}{2}$ height of body.	
a. No black on spinous dorsal.	
Supraorbital edge serrated; chest scaleless	1. *E. edentula*, p. 186.
Supraorbital edge not serrated; chest scaleless	2. *E. dussumieri*, p. 187.
Supraorbital edge serrated; chest scaly .	8. *E. lineolata*, p. 190.
b. More or less black on spinous dorsal.	
a'. Dorsal profile more convex than abdominal, or both similar. Ventral extends more than halfway to anal.	
a''. Chest scaly.	
Height of body $2\frac{1}{4}$ to $2\frac{1}{3}$ in total length	3. *E. splendens*, p. 188.
Height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in total length	6. *E. blochii*, p. 189.
b''. Chest scaleless.	
Supraorbital edge not serrated	4. *E. daura*, p. 188.
Supraorbital edge serrated	7. *E. brevirostris*, p. 190.
b'. Abdominal profile more convex than dorsal. Ventrals small, extending only halfway to anal.	
a''. Height of body less than half total length.	
Sides not spotted	5. *E. bindus*, p. 189.
Sides spotted	9. *E. insidiatrix*, p. 191.
b''. Height of body half total length .	10. *E. ruconius*, p. 192.
B. Longest dorsal spine more than half height of body.	
Height of body $2\frac{1}{3}$ in total length	11. *E. fasciata*, p. 192.
Height of body $3\frac{1}{2}$ to 4 in total length . .	12. *E. oblonga*, p. 193.

952. (1.) **Equula edentula.** (Fig. 65.)

Scomber edentulus, *Bl. Ich.* t. 428.
Equula edentula, *Day, Fish. India*, p. 238, pl. lii, fig. 1 (see synon.)

Soorookoo nam karé, Tam.; *Tanka chandee*, Ooriah; *Nga-hpee-ma*, Burm.; *Nga oogyee*, Arracan.

B. v. D. 8/15–16. P. 20. V. 1/5. A. 3/14. C. 17. L. l. 60.

Length of head 4, of caudal fin 4, height of body 2 to $2\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, about 1 diam. from end of snout and also apart. Dorsal profile rather more convex than that of the abdomen; snout obtuse. Interorbital cavity anteriorly rather wide, not quite twice as long as broad. A pair of small spines at anterior upper angles of orbit; supraorbital edge minutely serrated. Lower edge of preopercle very finely serrated. Mandible very concave. *Fins*—dorsal spines moderately strong, the second arched, compressed, and nearly $\frac{3}{4}$ length of head; third and fourth spines anteriorly serrated in their lower

portions. Ventral nearly, or in the young quite, reaches to the anal. Second anal spine as long as head behind middle of eyes or a little more; third spine rather strongly serrated anteriorly in its lower half. *Scales*—small, but distinct, except on chest or breast, to a little above base of pectoral, where they are absent or indistinct; a large scale at base of ventral. *Lateral line*—with about 60 tubes; it first curves upwards, its highest point being below the third

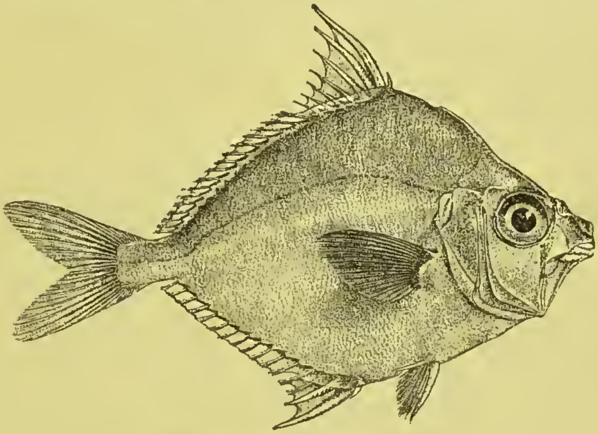

Fig. 65.—*Equula edentula.*

dorsal spine, then it arches to below end of dorsal fin. *Colour*—silvery, greyish along the lateral line; fine vertical lines from the back down the sides; the soft dorsal stained with grey on its upper edge; base of pectoral stained grey.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining 10 inches and more in length. Ascending rivers far above tidal reach, but only apparently whilst young.

953. (2.) Equula dussumieri.

Equula dussumieri, *Cuv. & Val. H. N. Poiss.* x, p. 77, pl. 283; *Day, Fish. India,* p. 239, pl. lii, fig. 2 (see synon.).

Veri karé, Tam.

B. v. D. 8/16. P. 21. V. 1/5. A. 3/14–15. C. 17. L. l. 65.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $\frac{2}{5}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, and 1 apart. Dorsal and abdominal profiles equally convex. Interorbital cavity anteriorly rather broad, and not twice as long as wide. A pair of small spines at the anterior upper angle of the orbit. Orbital margin not serrated. Mandibles slightly concave below. Lower margin of preopercle rather strongly serrated. *Teeth*—fine, and in several rows in both jaws. *Fins*—second dorsal spine almost straight and as long as head excluding snout, third nearly as long; front edge of both third and fourth

spines serrated near the base. Ventral does not quite reach the anal. Second anal spine rather weak, it is as long as the head behind first third or middle of eye; third anal spine a little shorter than second and serrated anteriorly. Caudal forked. *Scales*—small but distinct, except on the breast and chest, which are scaleless. A moderately strong scale at base of ventral. *Lateral line*—in tubes which are distinct anteriorly, but run into one another behind. *Colour*—silvery, no black spot on dorsal fin; base of pectoral dark, sometimes black. Dark and narrow vertical lines pass from back over lateral line.

Hab. Seas of India to Malay Archipelago; attaining at least 8 inches in length.

954. (3.) Equula splendens.

Equula splendens, *Cuv. Règne Anim.* 2e ed. 1829, ii, p. 212; *Day, Fish. India,* p. 239, pl. lii, fig. 3 (see synon.).

Goomorah karah, Tel.; *Kulli karé,* Tam.

B. v. D. 8/16. P. 17. V. 1/5. A. 3/14. C. 17. L. l. 55–60.

Length of head 4, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{4}$ to $2\frac{1}{3}$ in the total length. *Eyes*—diameter 3 in length of head, nearly 1 diam. from end of snout and also apart. Dorsal profile much more convex than abdominal. Snout obtuse. Interorbital cavity nearly twice as long as wide. A pair of fine spines, sometimes bifurcated, at anterior upper angle of orbit. Supraorbital edge rather coarsely serrated. Lower preopercular edge strongly serrated. Mandibles slightly concave. *Teeth*—in a single row in either jaw. *Fins*—dorsal spines strong, second about $\frac{1}{3}$ height of body, third strongly serrated along anterior edge of lower third, fourth and fifth also serrated. Ventral spine strong, the fin nearly reaches base of anal; second anal spine strong, about $\frac{1}{3}$ height of body, third serrated anteriorly along lower third. Caudal deeply forked. *Scales*—distinct, in irregular rows, and extended over the breast and chest; a large one at base of ventral. *Lateral line*—consisting of 60 or 70 short tubes, does not quite reach base of caudal fin. *Colour*—silvery, with a deep black blotch in upper half of spinous dorsal; a black mark over snout; axilla dark, and base of pectoral black posteriorly.

Hab. Red Sea, seas of India to the Malay Archipelago; attaining at least 5 inches in length.

955. (4.) Equula daura.

Equula daura, *Cuv. Règne Anim.* 2e ed. 1829, ii, p. 212; *Day, Fish. India,* p. 240, pl. lii, fig. 4 (see synon.).

Dacer karah, Tel.; *Rama karé,* Tam.

B. v. D. 8/15–16. P. 20. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from

end of snout, and nearly 1 apart. Dorsal profile slightly more convex than abdominal. Interorbital cavity a little more than twice as long as wide. A pair of very small spines at the anterior upper angle of the orbit. Orbital edge not serrated. Mandibles slightly concave; lips thick. Lower preopercular margin finely serrated. *Fins*—dorsal spines of moderate strength, the second nearly $\frac{1}{2}$ height of body, the third slightly serrated anteriorly near base. Ventral does not reach anal. Anal spines comparatively weak, the second $\frac{3}{10}$ height of body, the third serrated anteriorly in lower third. Caudal forked. *Scales*—small but distinct, none on breast or chest; an elongate one at base of ventral. *Lateral line*—with about 60 short tubes, placed on rounded plate-like scales: it does not extend on to caudal fin. *Colour*—silvery, with a golden stripe along side. A dark line along base of dorsal; a darkish triangular spot between occiput and dorsal fin; upper half of spinous dorsal black from second to fifth spines.

Hab. Ceylon and Coromandel coast to the Malay Archipelago; attaining at least 5 inches in length.

956. (5.) Equula bindus.

Equula bindus, *Cuv. & Val. H. N. Poiss.* x, p. 78; *Day, Fish. India*, p. 240 (see synon.).

Bindoo-karah, Tel.; *Tatnam karé*, Tam.

B. iv. D. 8/16. P. 15. V. 1/5. A. 3/15.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{4}$, height of body $2\frac{1}{3}$ in the total length. Abdominal profile more convex than dorsal, which is rather concave over orbits. *Fins*—second dorsal spine equal to about $\frac{1}{3}$ height of body. Ventrals short, scarcely reaching halfway to anal (Russell did not detect any spine in them). Second anal spine weaker and a little shorter than second dorsal. *Colour*—silvery olive over nape, fins hyaline, upper third of spinous dorsal orange, edged inferiorly with black.

Hab. Coromandel coast.

957. (6.) Equula blochii.

Equula blochii, *Cuv. & Val. H. N. Poiss.* x, p. 84; *Day, Fish. India*, p. 241, pl. lii, fig. 5 (see synon.).

B. v. D. 8/16. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{3}{4}$ to 5, height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, from $\frac{3}{4}$ to 1 apart. Dorsal profile rather more convex than abdominal, a slight concavity over occiput; the snout rather pointed and not truncated. Upper surface of orbit serrated; the serrations appear to become obsolete in some old specimens; a pair of small spines at the anterior upper angle. Lower edge of preopercle strongly serrated. Cavity on upper surface of head at least twice as long as wide. *Teeth*—in a single row in the

jaws. *Fins*—dorsal spines moderate, the second rather the longest and equal or nearly equal to ½ height of body; the third and fourth serrated anteriorly in their lower halves. Ventral reaches to the anal. Second anal spine $\frac{4}{9}$ height of body; the third finely serrated anteriorly. *Scales*—on body (except base of pectoral fin), breast, and chest; a rather large one at base of ventral. *Lateral line*—with about 60 tubes, situated on rounded scales. *Colour*—silvery, with a dark brown blotch over nape, and a black mark in upper half of spinous dorsal fin from third to sixth spines. Vertical zigzag yellow lines on back and sides, which soon fade after death; base of pectoral posteriorly dark-coloured.

Hab. Seas of India; common. I have this fish from Bombay, Malabar, Madras, Calcutta, and Akyab, and many young from the Sundarbans.

958. (7.) Equula brevirostris.

Equula brevirostris *Cuv. & Val. H. N. Poiss.* x, p. 83; *Day, Fish. India*, p. 241 (see synon.).

B. v. D. 8/16. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{1}{3}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter nearly $2\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Body oval, dorsal and abdominal profiles equally convex; snout pointed, not obtuse except just at its anterior extremity. Interorbital cavity nearly twice as long as broad. A pair of well-developed spines at anterior upper angle of eye; supraorbital edge finely serrated. Lower jaw very concave below. Lower limb of preopercle finely serrated. *Teeth*—in a single fine row in either jaw. *Fins*—dorsal spines moderately strong and compressed, second $\frac{4}{9}$ (sometimes $\frac{1}{3}$) height of body; third strongly serrated in its lower half, fourth in its lower fourth. Ventral reaches $\frac{2}{3}$ to anal. Second anal spine $\frac{2}{7}$ height of body, the third strongly serrated in lower half. Caudal forked. *Scales*—over body but not on breast or chest. *Lateral line*—with from 58 to 64 distinct tubes, not quite reaching to base of caudal fin. *Colour*—an oval black blotch on upper half of spinous dorsal, from third to seventh spine (it is sometimes very faint), and a dark brown transverse blotch across nape of neck. Pectoral posteriorly black at its base. A narrow yellow band from above the eye to centre of base of caudal.

Hab. Seas of India to China; attaining at least $4\frac{1}{2}$ inches in length.

959. (8.) Equula lineolata.

Equula lineolata, *Cuv. & Val. H. N. Poiss.* x, p. 86; *Day, Fish. India*, p. 241, pl. li C, fig. 3 (see synon.).

B. v. D. 8/16. P. 19. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{4}$, of caudal $4\frac{2}{3}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Body oblong; dorsal and abdominal profiles

equally convex, a slight concavity over occiput. Interorbital cavity at least twice as long as wide. A pair of minute spines over anterior third of orbit; supraorbital edge serrated or only a little rough to the feel. Inferior edge of mandible very slightly concave. Lower edge of preopercle minutely serrated. *Teeth*—fine and in a single row. *Fins*—dorsal spines weak, the second arched, and $\frac{1}{2}$ to $\frac{3}{7}$ height of body, the third and fourth anteriorly serrated in their lower halves. Ventral does not quite reach anal. Second anal spine arched, $\frac{1}{3}$ to $\frac{2}{5}$ height of body, the third spine anteriorly serrated. Caudal forked. *Scales*—small but distinct, present on breast and chest. *Lateral line*—disappears nearly at end of free portion of tail; it consists of above 60 tubes placed on a row of plate-like, rounded scales. *Colour*—silvery, with vertical zigzag lines passing down the back; base of pectoral black behind; upper edge of dorsal darkish.

Hab. Seas of India to the Malay Archipelago.

960. (9.) Equula insidiatrix.

Zeus insidiator, *Bloch, Ich.* t. 192, figs. 2, 3.

Equula insidiatrix, *Day, Fish. India,* p. 242, pl. li C, fig. 5 (see synon.).

Paarl coorchee, Mal.

B. v. D. 8–9/16–17. P. 18. V. 1/5. A. 3/14. C. 17.

Length of head from $4\frac{3}{4}$ to 5, of caudal fin 5, height of body $2\frac{1}{3}$ to $2\frac{2}{3}$ in the total length; (the young are much more elongate). *Eyes*—diameter $2\frac{1}{3}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{3}{4}$ to 1 apart. Abdominal profile more convex than dorsal. Premaxillaries very protractile. When fully protracted the mouth remains directed somewhat upwards, when closed the mandible is almost vertical and not concave. Interorbital cavity triangular. Middle third of supraorbital edge finely serrated. One or two minute supraorbital spines directed backwards at the anterior upper edge of the orbit; the external, when two are present, the stronger. Lower edge of preopercle minutely serrated, occasionally almost smooth. *Teeth*—minute, in 1 or 2 rows. *Fins*—dorsal spines weak, smooth; the first minute, the second, third, and fourth subequal in length and $\frac{1}{3}$ height of body. Second anal spine equal to diameter of orbit. Ventral minute, reaching halfway to anal. Caudal forked. *Scales*—minute over the body, breast, and chest, but not at base of pectoral fin. *Lateral line*—nearly parallel with back and generally lost near the tail, but sometimes as far forward as below middle or last third of dorsal. *Colour*—back bluish silver, abdomen whitish silver, the whole glossed over with a slightly golden tint. Upper surface of head, cheeks, and lower jaw burnished silver, often a black streak from eye to throat, joining that of opposite side; a dark mark in axilla. Three or four horizontal lines of black spots, with bronze reflexions, form from eight to ten vertical bands descending along upper half of body.

Spinous dorsal tipped with black; ventral white; pectoral light yellow; caudal yellowish, and stained at the end with brown.

Hab. Seas of India and the Malay Archipelago; said to be occasionally captured in fresh water.

961. (10.) Equula ruconius.

Chanda ruconius, *Ham. Buch. Fish. Ganges*, pp. 106, 371, pl. xii, fig. 35.

Equula ruconius, *Day, Fish. India*, p. 242, pl. li C, fig. 4 (see synon.).

Jitaka, Maráthi.

B. v. D. 8/16. V. 1/5. A. 3/14. C. 17.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{3}{4}$, height of body 2 in the total length ($1\frac{1}{2}$ to $1\frac{2}{3}$ in the young). *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. Dorsal profile much more convex than abdominal, a concavity over occiput. Premaxillaries very protractile; the mouth as in *E. insidiatrix*. Posterior half of supraorbital edge minutely serrated; one or two spines close to hind nostril. Lower edge of preopercle serrated, most coarsely anteriorly. *Teeth*—in a single, minute, and deciduous row. *Fins*—second dorsal spine longest, $\frac{2}{7}$ height of body, the third serrated anteriorly in lower third. Ventral reaches halfway to anal, second anal spine equals diameter of orbit. Caudal forked. *Scales*—very deciduous, apparently often absent throughout and usually so above the lateral line; they are from two to three times the size of those in *E. insidiatrix*, and are often extended on to the chest. *Lateral line*—in single tubes, usually ceasing below middle of soft dorsal, but sometimes continued to its last third. *Colour*—back bluish silvery, abdomen silvery white. A well-marked black streak from anterior edge of eye to throat, joining that of opposite side. A dark spot on upper part of opercle, back of base of pectoral black. Vertical lines of black marks having bronze reflexions descend down the upper third of the body and are often subdivided into spots. Spinous dorsal tipped with black.

Hab. Seas of India to the Malay Archipelago and beyond.

962. (11.) Equula fasciata.

Clupea fasciata, *Lacép. H. N. Poiss.* v, p. 460.

Equula fasciata, *Cuv. & Val. H. N. Poiss.* x, p. 96; *Day, Fish. India*, p. 243, pl. li C, fig. 2 (see synon.).

Karah, Tel.; *Katáti* Maráthi.

B. v. D. 8/16. P. 19. V. 1/5. A. 3/14. C. 17. Cæc. pyl. 3.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 4, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and nearly 1 apart. Dorsal profile rather more convex than abdominal. A concavity over occiput. Interorbital cavity nearly twice as long as wide. A pair of spines above the anterior upper angle of orbit. Orbital edge not serrated. Lower

edge of preopercle nearly straight and very finely serrated. Mandible slightly concave below. *Teeth*—in a single row in the upper jaw; in villiform bands in the lower. *Fins*—dorsal spines of moderate strength, second elongate, usually about $\frac{4}{5}$ as high as body, third and fourth serrated anteriorly. Ventral reaches $\frac{3}{4}$ of the way to the anal. Second anal spine strong, about $\frac{2}{5}$ height of body but sometimes much longer. Caudal forked. *Scales*—cover body, absent or exceedingly indistinct on chest. *Lateral line*—consists of about 65 tubes, it ceases just before the base of the caudal fin. *Colour*—silvery, with irregular vertical streaks on the body.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond.

963. (12.) Equula oblonga.

Equula oblonga, *Cuv. & Val. H. N. Poiss.* x, p. 85; *Day, Fish. India*, p. 243 (see synon.).

B. v. D. 8/16–17. P. 16. V. 1/5. A. 3/14–15. C. 16.

Length of head 4 to $4\frac{1}{3}$, of caudal fin $5\frac{1}{3}$, height of body $3\frac{1}{2}$ to 4 in total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout, and 1 apart. Abdominal profile rather more convex than dorsal. Snout rather pointed. Interorbital cavity much longer than wide. Orbital edge not serrated; two spines above anterior edge of eye. Lower preopercular edge finely serrated. Lower edge of mandible slightly concave. *Teeth*—in a single row in either jaw. *Fins*—dorsal spines moderately strong, second $\frac{2}{3}$ height of body. Ventral reaches $\frac{2}{3}$ of way to anal, second spine of latter $\frac{1}{2}$ height of body. Caudal forked. *Scales*—very minute, none on chest. *Colour*—greyish on back, becoming silvery below; a silvery band along the side, irregular angular bands over the back to as low as the lateral line. No black on dorsal fin.

Hab. Red Sea, seas of India to Malay Archipelago and beyond.

12. Genus GAZZA, Rüpp.

Branchiostegals five; pseudobranchiæ. Body oblong, elevated, and compressed. Mouth very protractile. Lower preopercular margin serrated. Teeth, a pair of canines besides a row of pointed teeth in the upper, a conical row in the lower jaw. A single dorsal fin, having fewer spines than rays; anal with three spines continuous with the soft portion, which has fewer rays than the soft dorsal; no finlets. Lateral line unarmed.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago and beyond.

Synopsis of Indian Species.

Silvery, eyes $\frac{2}{3}$ diameter apart .... 1. *G. minuta*, p. 194.
Silvery, eyes 1 diameter apart .... 2. *G. equulæformis*, p. 194.
Greyish with dark lines along rows of scales. 3. *G. argentaria*, p. 195.

964. (1.) Gazza minuta. (Fig. 66.)

Scomber minutus, *Bl. Ich.* t. 429, fig. 2.
Gazza minuta, *Day, Fish. India,* p. 244, pl. liii, fig. 1 (see synon.).
Kotoo kare, Tam.; *Komah-karah,* Tel.; *Gar-chum,* Belooch.

D. 8/16. P. 17. V. 1/5. A. 3/14. C. 19.

Length of head $3\frac{3}{4}$, of caudal fin $4\frac{2}{3}$ to 5, height of body $2\frac{1}{4}$ to $2\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ to $2\frac{3}{4}$ in length of head, $\frac{2}{3}$ diam. from end of snout, and $\frac{3}{4}$ apart. Supraorbital edge serrated, two spines above anterior third of eye. Lower edge of preopercle coarsely serrated, especially anteriorly. *Teeth*—a pointed row in premaxillaries, and two canines opposite the symphysis; villiform in the lower jaw, with an outer row of large conical ones, increasing in size with age. *Fins*—dorsal spines weak, the second and third about the same height, and $\frac{3}{7}$ of that

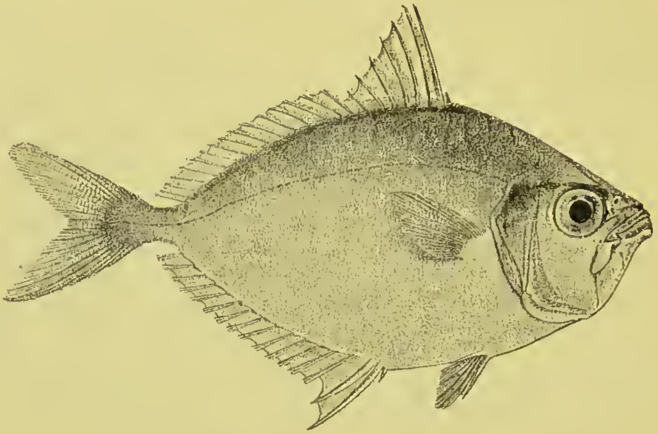

Fig. 66.—*Gazza minuta.*

of the body. Ventral reaches $\frac{2}{3}$ of way to the anal. Second anal spine from $\frac{3}{7}$ to $\frac{1}{3}$ height of body. *Scales*—on body, but absent from chest or very inconspicuous. *Lateral line*—on a row of plate-like scales and in about 60 tubes, it ceases either below end of dorsal or close to base of caudal fin. *Colour*—silvery, with irregular bluish or yellowish lines descending from back to lateral line, the axilla black; anterior portion of dorsal fin dark.

Hab. Seas of India to the Malay Archipelago and beyond.

965. (2.) Gazza equulæformis.

Gazza equulæformis, *Rüpp. N. W., Fische,* p. 4, t. i, fig. 3; *Day, Fish. India,* p. 244 (see synon.).

B. v. D. 8/16. P. 15. V. 1/5. A. 3/14. C. 17.

Length of head $3\frac{1}{2}$ to 4, of caudal fin $4\frac{1}{3}$, height of body $2\frac{1}{3}$ to

3 in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Dorsal and abdominal profiles about equally convex. Supraorbital edge serrated, sometimes coarsely so, two spines above front third of each eye. Inferior surface of mandible scarcely concave. Lower margin of preopercle rather strongly serrated. *Teeth*—a row of pointed ones in the upper jaw, having two canines in the median line; villiform in the lower jaw, with an outer row of curved and pointed ones, which increase in size anteriorly, becoming like canines on either side of the symphysis. *Fins*—dorsal spines weak, second and third about the same length, and from $\frac{1}{2}$ to $\frac{3}{7}$ height of body. Ventral reaches $\frac{2}{3}$ of way to anal. Second anal spine stronger than those of the dorsal, and about $\frac{1}{3}$ height of body, the third rough anteriorly in its lower third. Caudal forked. *Scales*—over body, none on breast and chest. *Lateral line*—in single tubes, ceasing opposite last third of soft dorsal. *Colour*—greyish along back, silvery on sides and beneath, zigzag irregular bluish bands descend from back to as low as lateral line. Spinous dorsal fin with brown spots, especially between second and third spines; axilla usually brown or black. The young have a silvery band along the sides.

Hab. Red Sea, seas of India to the Malay Archipelago; attaining at least 6 inches in length. Very common along all the coasts of India as far as Sind.

966. (3.) Gazza argentaria.

Zeus argentarius, *Bl. Schn. Syst. Ich.* p. 96.
Gazza argentaria, *Day, Fish. India, Suppl.* 1888, p. 790.

Psani pare, Tamil.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 5, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eye*—diameter 3 in length of head, $\frac{2}{3}$ diam. from end of snout. *Teeth*—canines of moderate size. *Fins*—first dorsal higher than second. *Colour*—body greyish, with some dark lines along the rows of scales; light-coloured on the chest; dorsal, anal, and ventral fins nearly black, caudal of a dull yellow.

Hab. Red Sea, Madras to the Malay Archipelago.

13. Genus **LACTARIUS**, Cuv. & Val.

Branchiostegals seven; pseudobranchiæ. Body oblong, compressed. Eyes lateral. Cleft of mouth deep, with the lower jaw prominent. Preopercular margins entire. Teeth in jaws small, with one or two pairs of strong canines. Two dorsal fins, the first with seven or eight feeble spines, second and the anal with many rays; anal with three spines joined to the remainder of the fin. Scales cycloid, of moderate size, some over the second dorsal and anal fins. Lateral line continuous, unarmed. Air-bladder bifurcated both anteriorly and posteriorly. Pyloric appendages few.

Geographical Distribution. Seas of India to the Malay Archipelago.

967. (1.) Lactarius delicatulus. (Fig. 67.)

Scomber lactarius, *Bl. Schn. Syst. Ich.* p. 31.
Lactarius delicatulus, *Cuv. & Val. H. N. Poiss.* ix, p. 238; *Day, Fish. India*, p. 245, pl. liii, fig. 2 (see synon.).

Purruwah, Mal.; *Sudumu*, Telugu (Gopálpur); *Nga thong toong*, Arracan.

D. 7–8 | 1/21–22. P. 17. A. 3/25–28. C. 17. L. l. 74–80. C. p. 6.

Length of head 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and $\frac{4}{5}$ apart. Mouth oblique and large. Preorbital narrower than the maxillary; preopercle narrow, with its angle rounded. Opercle ending in a soft point. Interorbital space convex. Occipital crest well developed, the lateral ridges moderately so. *Teeth*—a curved canine on each side of the symphysis of the upper jaw, and a single lateral row; a central canine (occasionally two) in lower

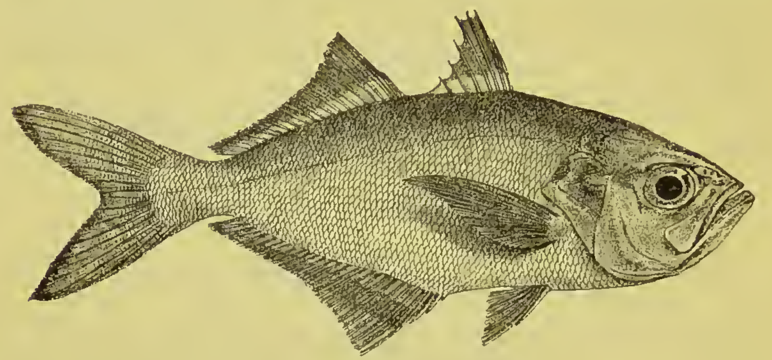

Fig. 67.—*Lactarius delicatulus.*

jaw, and laterally a single row of curved teeth. Teeth on vomer, palatines, and tongue. *Fins*—first dorsal spine weak, the third longest; membrane rather deeply notched. Second dorsal highest anteriorly, where it nearly equals the first dorsal. Anal similar to second dorsal. In many specimens taken in Malabar, the anal rays were invariably 26, but amongst several taken in Madras they were in all instances 28. Caudal rather deeply lobed. *Lateral line*—in short single tubes. *Colour*—upper surface of head and back as low as lateral line lead-colour; a black spot on upper and posterior part of opercle. Fins diaphanous, marginal halves of dorsals and caudal minutely dotted with black, sometimes the base is also dark. Iris silvery, upper portion darkish.

Hab. Seas of India, Malay Archipelago, and China. Grows to at least 10 inches in length, is eaten by the natives either fresh or salted, but is insipid. It appears in Malabar in shoals during the months of February and March, but a few are present throughout the year.

Family XVIII. STROMATEIDÆ.

Gill-openings wide. Eyes lateral. The infraorbital bones do not articulate with the preopercle. Small teeth in the jaws, palate edentulous; barbed teeth extend into the œsophagus. One long dorsal fin without any distinct spinous division, or with rudimentary spines anteriorly; ventrals, when present, thoracic. No prominent papilla near the vent. Air-bladder, when present, small. Pyloric appendages few, in moderate numbers, or numerous. Vertebræ exceed 10 in the dorsal and 14 in the abdominal region.

Geographical Distribution. Most tropical and temperate seas. One genus only.

1. Genus **STROMATEUS**, Artedi.

Syn. *Peprilus*, Cuv.; *Apolectus*, *Seserinus*, Cuv. & Val.; *Stromateoides*, Bleeker; *Chondroplites* and *Poronotus*, Gill.

Branchiostegals five to seven; pseudobranchiæ. Body compressed, more or less elevated. Cleft of mouth narrow or of moderate depth. Teeth small, in a single row in the jaws. A single long dorsal and anal fin, with rudimentary spines anteriorly: ventral fins not present in adults. Scales small, covering the vertical fins. Lateral line, as a rule, smooth (keeled in *S. niger*). Air-bladder absent. Pyloric appendages numerous.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Species.

A. Lateral line not keeled.
Height of body much more than half total length. No spines before dorsal or anal .. 1. *S. sinensis*, p. 197.
Height of body about half total length. Short spines before dorsal and anal .... 2. *S. cinereus*, p. 198.
B. Hindermost portion of lateral line keeled.
Height of body $\frac{3}{7}$ to $\frac{1}{3}$ total length .... 3. *S. niger*, p. 199.

968. (1.) **Stromateus sinensis.**

Stromateus sinensis, *Euphrasin, Vetensk. Acad. Nya Handl. Stockh.* ix, p. 49, t. ix; *Day, Fish. India*, p. 246, pl. li C, fig. 6 (young) (see synon.).

Atoo koia, Tel.; *Vella arwoolee*, Mal.; *Mogang voval*, Tam.; *Chándava*, Maráthi; *Omalayta*, Arabi; *White pomfret.*

B. vi. D. 43–50. P. 25. A. 39–42. C. 19.

Length of head $4\frac{1}{3}$ to 5, of pectoral $3\frac{1}{2}$ to 4, of caudal $4\frac{1}{3}$ to 5, height of body $1\frac{1}{2}$ to $1\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{2}{3}$ to 1 diam. from end of snout, and $1\frac{2}{3}$ apart. Dorsal and abdominal profiles about equally convex.

The lower jaw the longer, especially in young specimens. *Teeth*—becoming lost with age. *Fins*—first four or five dorsal spines very short, and not appearing above the skin, anterior portion of fin similar to that of anal and equal to length of pectoral. First five anal spines short and not appearing above skin. Caudal with equal lobes, in the young slightly emarginate. *Scales*—small and very deciduous, especially in the immature, in adults they cover the vertical fins. *Colour*—upper surface of head and body as far as the lateral line of a deep neutral tint, the rest of body brownish grey, with metallic reflections, becoming lighter and silvery towards the abdomen; body dotted all over with brown, the larger spots having a silvery point in their centre. Fins silvery grey, the marginal half blackish. Cavity of mouth and tongue pale bluish grey with brown dots, silvery in the centre. Iris reddish silver or copper-coloured, minutely dotted with brown. The *young* are grey, the head covered with irregular star-shaped spots, and the fins nearly black, especially at their edges.

Hab. Seas of India, Malay Archipelago, and China. This species of Pomfret is that most esteemed for eating; in Malabar it is by no means rare during the S.W. monsoon (from June till September). It should be cooked when quite fresh. The young are common round the coasts and ascend estuaries. I found them numerous during March in the Sundarbans.

969. (2.) Stromateus cinereus. (Fig. 68.)

Stromateus cinereus, *Bloch, Ich.* xii, p. 90, t. 420 (semi-adult); *Day, Fish. India,* p. 247, pl. liii, fig. 3 (see synon.).

Sudi sandawah, Tella sandawah, Tel.; *Vella voval,* Tam.; *Saranga,* Marâthi; *Roojana,* Arracan; *Roop chanda,* Chittagong; *Nga moo* and *Nga pamoung,* Burmese; *Silver pomfret* (immature); *Grey pomfret* (adult).

B. vii. D. 5–9 | 1/38–43. P. 27. A. 5–6 | 1/32–41. C. 19.

Length of head 4 to $4\frac{1}{2}$, of pectoral $2\frac{1}{3}$ to $2\frac{2}{3}$, height of body $1\frac{1}{3}$ to $1\frac{2}{3}$ in the total length excluding the caudal fin. *Eyes*—diameter 4 to 5 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. Snout projecting over the mouth. *Fins*—the dorsal and anal spines appear in a truncated form above the skin; anterior portion of soft dorsal elevated, but not to so great an extent as the anterior part of the anal, which in the immature reaches to below middle of caudal fin, but as age advances gradually becomes shorter. Pectoral rather pointed. Caudal deeply forked, the lower lobe much the longer in the immature, sometimes being twice as long as the upper. *Colour*—upper surface of head and back as low as lateral line greyish neutral tint with purplish reflexions, sides of head and body silvery grey, fading to white on abdomen, and everywhere covered with minute black dots; a dark spot on upper portion of opercle. Dorsal and anal grey minutely dotted with black, the outer half darker. Caudal and pectoral yellowish white, also

minutely dotted with black, the outer half darker. Iris silvery. The *young* are much darker, the vertical fins being nearly black.

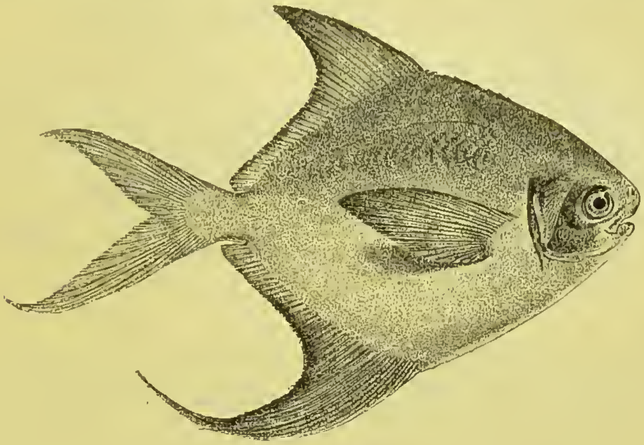

Fig. 68.—*Stromateus cinereus.*

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least a foot in length.

970. (3.) Stromateus niger.

Stromateus niger, *Bloch, Ich.* t. 422; *Day, Fish. India,* p. 247, pl. liii, fig. 4 (see synon.).

Saranga, Maráthi; *Nala-sanda-wah,* Tel.; *Baal,* Ooriah; *Curroopoo-voval,* Tam.; *Kar-arwoolee,* Mal.; *Ko-liy-dah,* And.

B. vii. D. 5/42–44. P. 22. A. 3/35–39. C. 19.

Length of head $4\frac{1}{2}$, of caudal 4, height of body $2\frac{1}{3}$ to 3 in total length. *Eyes*—diameter $4\frac{1}{4}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and nearly 2 apart. The lower jaw the longer. *Fins*—dorsal and anal much elevated in front, very low behind, with concave margins. Pectoral $\frac{1}{2}$ longer than head, and falciform: ventrals only apparent in the young; in a specimen $3\frac{3}{10}$ inches in length they are jugular and $\frac{1}{8}$ total length. The spines, before the dorsal and anal fins, which are concealed in the adult fish, are apparent in young specimens. *Lateral line*—gently curves downwards, its last fourth passes straight to middle of tail, in the form of a raised keeled line with lateral shields as in the genus *Caranx. Colour*—deep brown or greyish brown with blue reflexions; cheeks, opercles, and abdomen pale neutral or brownish neutral. Dorsal and anal greyish brown, stained black towards their margins; pectoral and caudal brownish, edged with black. Iris brownish blue; in the young grey. The dorsal and anal fins black, and the tail yellow, with three brown cross bands.

Hab. Seas of India to the Malay Archipelago and China. Grows to two feet in length and is excellent eating. It appears in Malabar about the same time as *S. sinensis*; it comes in shoals, and disappears as suddenly as it arrives.

Family XIX. CORYPHÆNIDÆ.

Gill-openings wide. Eyes lateral. The infraorbital bones do not articulate with the preopercle. One long dorsal fin, without distinct spinous division; ventrals thoracic (except in *Pteraclis*, when they are jugular). No prominent papilla near the vent. Air-bladder present or absent. Pyloric appendages few or many. Vertebræ exceed 10/14.

Geographical Distribution. Pelagic, throughout tropical and temperate seas.

Synopsis of Indian Genera.

Dorsal fin commencing on occiput; scales present .... 1. Coryphæna.
Dorsal fin commencing on the back; scales absent .... 2. Mene.

1. Genus CORYPHÆNA, Linn.

Syn. *Lampugus* (immature), Cuv. & Val.

Branchiostegals seven; pseudobranchiæ absent. Body rather elongate and compressed. Preopercle entire. Teeth in the jaws, on vomer, palatines, and tongue. A single long dorsal fin extending from the occiput nearly to the caudal, but without distinct spines, neither are they apparent in the anal; ventral thoracic and well developed. Scales small, cycloid. Air-bladder absent. Pyloric appendages numerous.

Geographical Distribution. Seas of temperate and tropical regions.

971. (1.) Coryphæna hippurus. (Fig. 69.)

Coryphæna hippurus, *Linn. Syst. Nat.* p. 446; *Day, Fish. India*, p. 248, pl. liii, fig. 6 (see synon.).

Badahlan, Tam.; *Dolphin.*

D. 58–63. P. 21. V. 1/5. A. 25–27. C. 19.

Length of head $5\frac{1}{6}$ to 6, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 6 in length of head, 3 diam. from end of snout, and $1\frac{1}{2}$ apart. Body elongate and compressed; occipital crest well developed. Cleft of mouth rather oblique, the lower jaw the longer. *Teeth*—in numerous villiform rows in either jaw, with an outer somewhat enlarged row. *Fins*—dorsal commences over posterior edge of orbit, first 7 or 8 rays gradually increase in length, last in fin not quite $\frac{1}{3}$ length of highest, the fin reaches to within a short distance of root of caudal. Pectoral falcate; the anal is highest in front, but after the third or fourth ray its margin becomes parallel with the abdomen; caudal with

deeply pointed lobes. *Lateral line*—curved to opposite the end of the pectoral, thence it goes straight to middle of tail. *Colour*—back greyish, shot with gold; abdomen golden, covered with

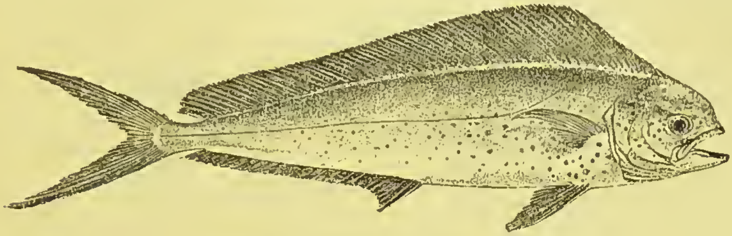

Fig. 69.—*Coryphæna hippurus.*

blue spots, which become black after death; dorsal fin light blue at the base, becoming black towards the summit.

Hab. All tropical and subtropical seas. Attaining 5 feet or more in length. This fish, the dolphin of sailors, is not uncommon in Madras, and is eaten by the natives.

2. Genus **MENE**, Lacép.

Branchiostegals seven. Body oval, strongly compressed, with a prominent and sharp-edged abdomen. Mouth very protractile. Villiform teeth in the jaws, palate edentulous. A single long dorsal fin, commencing on the back and extending nearly to the caudal; anal spineless, having many rays which are enveloped in skin and have very broad free extremities; ventrals thoracic, 1/5, the first ray very elongate. Scales absent. Air-bladder large and bifurcated posteriorly. Pyloric appendages numerous.

972. (1.) **Mene maculata.** (Fig. 70.)

Zeus maculatus, *Bl. Schn. Syst. Ich.* p. 95, pl. 22.
Mene maculata, *Day, Fish. India,* p. 249, pl. liii, fig. 5 (see synon.).
Ambutan parah and *Amatti katti,* Tam., *i. e. "rasor,"* Jerdon.

D. 3–4/40–43. P. 15. V. 1/5. A. 30–33. C. 18. Cæc. pyl. 25–30.

Length of head 4, of caudal fin 4, height of body $1\frac{3}{4}$ to 2 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{4}{5}$ diam. apart, and 1 to $1\frac{1}{3}$ from end of snout. Mouth oblique, the lower jaw projecting, cleft twice as long as the gape; anterior portion of upper jaw formed by premaxillaries, the maxilla smooth and S-shaped. Opercles entire. Occipital crest high. *Fins*—first few dorsal rays undivided and more elevated than remainder. Pectoral rays flat; ventral spine short, the first ray compressed and very long. Anal rudimentary, its rays forming short, wide, and flat processes; caudal deeply lobed. *Lateral line*—sometimes ceasing below end of dorsal fin, or dividing into two branches, the lower of which descends on reaching the upper caudal lobe. *Colour*

—deep blue along the back, becoming silvery white on the sides and abdomen; two or three rows of large spots along the body above the level of the pectoral fin.

Fig. 70.—*Mene maculata.*

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least 8½ inches in length.

Family XX. SCOMBRIDÆ.

Gill-openings wide; eyes lateral. The infraorbital bones do not articulate with the preopercle. Teeth present in the jaws, absent or present on the palate. Two dorsal fins, the first distinct from the second, which has more rays than the first has spines; finlets present or absent; ventrals thoracic (jugular in *Hypsiptera*); no prominent papilla near the vent. Side of tail sometimes keeled. Scales, if present, small. Air-bladder present or absent. Pyloric appendages moderate, numerous, or dendritical. Vertebræ exceed 10/14.

Synopsis of Indian Genera.

A. From 5 to 10 finlets behind both dorsal and anal.
  a. Teeth small, body scaled throughout; 2 low ridges on each side of tail .... 1. SCOMBER.
  b. Teeth small, scales on anterior portion of body only, a single longitudinal ridge on each side of the tail.
    Vomerine and palatine teeth present .... 2. THYNNUS.
    Vomerine teeth wanting, palatine present ...... 3. PELAMYS.
  c. Teeth larger, scales rudimentary or wanting .... 4. CYBIUM.
B. No finlets.
  First dorsal replaced by free spines .... 5. ELACATE.
  First dorsal replaced by an adhesive disk .... 6. ECHENEIS.

1. Genus SCOMBER, Artedi.

Branchiostegals seven; pseudobranchiæ. Body rather elongate and compressed. Eyes with adipose lids. Cleft of mouth deep. Small deciduous teeth in the jaws; and in some cases on the vomer and palatine bones. Two dorsal fins, the first spinous and separated by an interspace from the second, behind which and also behind the anal are five or six finlets; the spines in the first dorsal less numerous than the rays in the second or in the anal. Ventrals thoracic. Two slight keels on either side of the root of the caudal fin. Scales small. Air-bladder, when present, simple. Pyloric appendages numerous.

Geographical Distribution. All temperate and tropical seas. This genus contains the mackerels.

Synopsis of Indian Species.

A. No teeth on palate.
  Height of body 4 to $4\frac{2}{3}$ in total length . 1. *S. microlepidotus*, p. 203.
  Height of body $3\frac{2}{3}$ in total length .... 2. *S. brachysoma*, p. 204.
B. Teeth in palate; height of body 7 in total length .... 3. *S. janesaba*, p. 205.

973. (1.) Scomber microlepidotus. (Fig. 71.)

Scomber microlepidotus, *Rüppell, N. W., Fische*, p. 38, t. xi, fig. 2; *Day, Fish. India*, p. 250, pl. liv, figs. 3 (young), 4 (immature), & 5 (adult), *Suppl.* p. 790 (see synon.).

Mekha, Arabic; *Karna-kita* or *Karnang-kulhutan*, Tam.; *Kanagurta*, Tel.; *Ila*, Mal.; *Nga-congree*, "Large head," Mugh; *Look-wa-dah*, Andam.

D. 8–10 | 1/11+v–vi. A.1/11+v–vi. L.l.130 to 150. L.tr.10/28.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body 4 to $4\frac{2}{3}$ in the total length. *Eyes*—with a broad anterior and posterior adipose lid extending $\frac{1}{3}$ across the eye; diameter 4 to $4\frac{1}{2}$ in length of head, 1 to

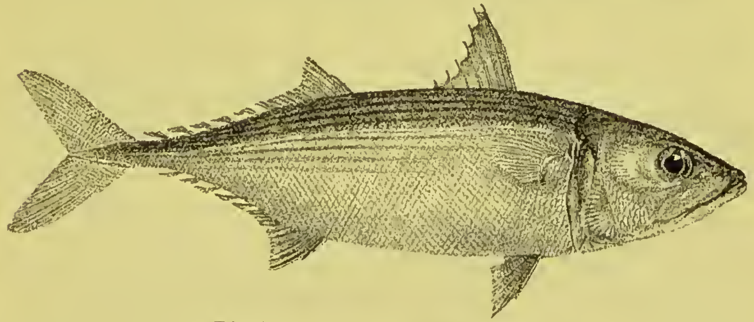

Fig. 71.—*Scomber microlepidotus.*

$1\frac{1}{4}$ diam. from end of snout and also apart. Interorbital space flat. *Teeth*—none on vomer or palate. *Fins*—dorsal spines weak and receivable into a groove, 2nd to 8th subequal and about

½ height of body, they rapidly decrease in length behind. The distance between the two dorsal fins equals half the base of the posterior, the upper edge of which is concave; finlets commence just behind the fin and are opposite to and similar to those behind the anal. *Scales*—smaller above than below lateral line, and largest just beneath pectoral fin; the first few rows beneath the lateral line are parallel with it, those below the pectoral are irregularly concave. Minute scales on second dorsal and anal fins. *Air-bladder*—present. *Pseudobranchiæ*—largely developed. *Colour*—back greenish, sides and abdomen iridescent, a row of sixteen spots along summit of back, close to base of dorsal fin; summit of head spotted; sides shot with bluish purple. Dorsal fins yellowish, tipped with black; caudal bright yellow, stained with black at its extremity. Pectoral bright yellow, with a dark mark on the body below it; ventral and anal finely dotted with black, which fades soon after death, when the colour becomes dull green with the abdomen lighter. Posterior edge of caudal sometimes blackish with a white outer margin. In large specimens the colours differ, there are from five to eight dark longitudinal bands along the back and upper half of the body, the highest of which is occasionally broken up into spots. There are usually two golden bands below the lateral line, and one along its course.

Hab. Red Sea, seas of India, and the Malay Archipelago. Along the coasts of India this fish is very rarely seen above 10 inches in length, but at the Andamans I obtained what I took for a distinct species, a foot long, and differently coloured, as described above. I have captured this species at Madras, with fully developed ova, in March. In Malabar it is very common throughout the cold season, and is extensively salted and dried. Although good eating, it is seldom brought to the table of Europeans, as it rapidly taints.

974. (2.) Scomber brachysoma.

Scomber brachysoma, *Bleeker, Batavia Nat. Tijdsch.* i, p. 356; *Day, Fish. India,* p. 251 (see synon.)

D. 10 | 1/11+v. A. 1/11+v. C. 21. L. l. 135. L. tr. 13/—.

Length of head $3\frac{3}{4}$, height of body $3\frac{1}{4}$ to $3\frac{2}{3}$ in the total length. *Eyes*—with a broad anterior and posterior adipose lid, diameter $4\frac{1}{3}$ in length of head, $1\frac{1}{3}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Hind edge of subopercle is vertically behind the level of the hind edge of the opercle. *Teeth*—none on vomer or palate. *Fins*—dorsal spines weak and receivable into a groove, the second and third the highest and rather above ½ height of body, upper edge of second dorsal fin concave, finlets commence just behind the fin and are opposite to and similar to those behind the anal. *Colour*—similar to that of *S. microlepidotus*, except that there are two shining light spots above and behind either eye, and the spinous dorsal is posteriorly edged with black.

Hab. Andaman Islands to the Malay Archipelago.

975. (3.) **Scomber janesaba.**

Scomber janesaba, *Bleeker, Batavia Nat. Tijdsch,* vi, p. 406; *Day, Fish. India, Suppl.* 1888, p. 790.

D. 9–10 | 1/11 + v–vi. A. 1 | 1/10–11 + v–vi. L. l. ca. 180.

Length of head $3\frac{1}{2}$, height of body 7 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout more pointed than in the preceding species. *Teeth*—in pairs of moderate strength and well developed on the head of the vomer and on the palatines. *Colour*—similar to that of *S. microlepidotus*, with the addition of two or more rows of dark spots along the back and also some transverse dark streaks.

Hab. From the Persian Gulf to Japan.

2. Genus **THYNNUS** (Cuv. & Val.), Lütken.

Syn. *Orcynus*, Cuv.; *Grammatorcynus*, Gill.

Branchiostegals seven; pseudobranchiæ. Body oblong, somewhat compressed. Cleft of mouth deep. Small teeth on the jaws and palatine bones, none on vomer. Two dorsal fins, the spines weak, finlets behind the soft dorsal and anal. Scales small; those in the anterior portion of the body form a kind of corselet, behind which the body is scaleless. Lateral line unarmed, a longitudinal keel along either side of the free portion of the tail. Air-bladder, when present, simple. Pyloric appendages numerous.

Geographical Distribution. The "tunny fishes" are found in most open tropical and temperate seas. These fishes are very voracious, and may often be observed in schools pursuing the "flying fishes" or other *Clupeidæ*. As food they are moderately esteemed.

Synopsis of Indian Species.

Pectoral about $\frac{1}{6}$ total length or less.
  Height of body contained $4\frac{1}{3}$ times in length to middle of tail-fin .... 1. *T. thunnina*, p. 205.
  Height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in length to middle of tail-fin .... 2. *T. pelamys*, p. 206.
Pectoral about $\frac{3}{11}$ total length .... 3. *T. macropterus*, p. 207.

976. (1.) **Thynnus thunnina.** (Fig. 72.)

Thynnus thunnina, *Cuv. & Val. H. N. Poiss.* viii, p. 104, pl. 212; *Day, Fish. India*, p. 252, pl. liv, fig. 6 (see synon.).

Choori min and *Suraly*, Tam.

D.15 | 2–3/10–11 + viii. P.26. V.1/5. A.2–3/10–11 + vii–viii. C.17.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $4\frac{1}{3}$ in length from snout to middle of posterior edge of caudal fin. *Eyes*—diameter

$6\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Head rather compressed, snout pointed. Posterior border of preopercle short, angle rounded, and lower edge at least twice as long as vertical. *Fins*—first dorsal spine the broadest, equal in height to second, and $\frac{1}{2}$ as long as head. In some specimens the first dorsal fin is continued to within a short distance of the second, in others (as in the one figured) the last few spines are nearly or quite hidden in the integument. Second dorsal highest anteriorly, having a concave upper edge, its three spines are short and concealed by the skin; finlets rather large. Between the two ventral

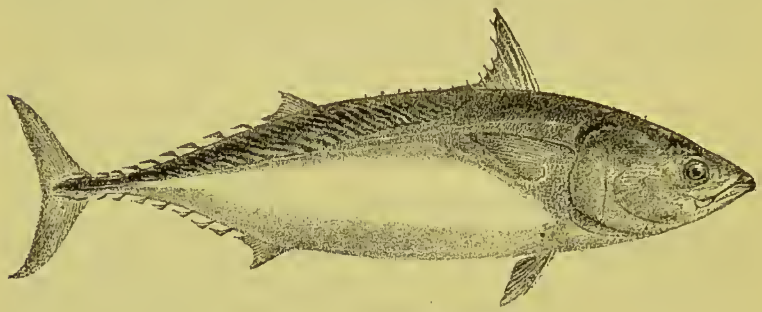

Fig. 72.—*Thynnus thunnina.*

fins an oval or elongate lamella, under which they can be partially received. Anal similar to second dorsal, the three spines equally concealed. *Scales*—forming a corselet anteriorly in three portions separated by two deep emarginations. Superiorly the corselet embraces the two dorsal fins, and is divided from its central portion by an emargination which reaches to below the eighth dorsal spine. The central portion of the corselet is mostly beneath the pectoral fin, and the emargination which divides it from the inferior portion extends to below the base of the pectoral. The lowest portion goes to below and behind the ventral fins. *Colour*—bluish along the back, with a number of undulating oblique dark bands; silvery below the lateral line; sometimes black spots on the chest or breast.

Hab. Red Sea, seas of India to the Malay Archipelago, where this fish is common during the cold months; also found in the Mediterranean, tropical parts of the Atlantic, and in Scandinavian seas. Often seen in the Bombay markets in the cold season up to two feet in length.

977. (2.) Thynnus pelamys.

Scomber pelamis, *Linn. Syst. Nat.* i, p. 492.
Thynnus pelamys, *Günther, Cat.* ii, p. 364; *Day, Fish. India,* p. 252 (see synon.).

The Bonito.

D. 15 | 1–2/12+viii. P. 27. V. 1/5. A. 2/12+vii.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in length from snout to middle of posterior margin of caudal fin. *Eyes*—diameter 5 to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout. The vertical border of the preopercle is $\frac{3}{5}$ the length of its horizontal margin. *Fins*—dorsal spines rather weak, anteriorly $\frac{2}{3}$ height of body and nearly twice as high as second dorsal. Pectoral reaches to below tenth dorsal spine. Anal similar to second dorsal, it commences on the vertical behind last dorsal ray. Caudal with pointed lobes. *Scales*—forming a corselet anteriorly, which extends from the base of the pectoral along the whole length of the spinous dorsal. *Colour*—back bluish, becoming silvery on the sides and beneath. Four or five concave, longitudinal dark bluish bands along the lower half of the abdomen posteriorly, ending on the lateral line below the finlets.

Hab. Indian and Atlantic Oceans; attaining a considerable size.

978. (3.) Thynnus macropterus.

Thynnus macropterus, *Temm. & Schleg. Fauna Japon., Poiss.* p. 98, pl. 51; *Day, Fish. India*, p. 253 (see synon.).

D. 14 | 3/12+ix. P. 31. V. 1/5. A. 12+ix. C. 28.

Length of head and height of body each $3\frac{2}{3}$ in the length from snout to middle of posterior margin of caudal fin. *Eyes*—diameter 5 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Preopercle with its posterior margin somewhat irregular in shape, angle pretty well developed, its posterior third longer than its lower margin. *Fins*—the anterior dorsal spines about $\frac{4}{9}$ height of body; second dorsal considerably longer than the spinous and falciform. Anal similar to soft dorsal. Caudal with pointed lobes. Corselet with three distinct posterior prolongations, the upper, commencing below the 7th dorsal spine, is continued along the base of the two dorsal fins; the second ceases below the 11th dorsal spine, and a little above the middle of the body; the lowest extends along the abdomen to midway between the end of the ventral and commencement of the anal. A well-developed keel on the lateral line commencing from opposite the tenth finlet. *Colour*—greyish along the back, becoming silvery below, tips of soft dorsal and anal, as well as the finlets, yellow.

Hab. Red Sea, seas of India to Japan.

3. Genus PELAMYS, Cuv. & Val.

Syn. *Gymnosarda* and *Orcynopsis*, Gill.

Branchiostegals seven; pseudobranchiæ. Body rather elongate and slightly compressed. Cleft of mouth deep. Rather strong teeth in jaws, none on vomer, present on palatines. Two dorsal fins, the spines feeble or of moderate strength, finlets behind soft dorsal and anal fins. Scales small, those in the anterior portion of

the body form a kind of corselet. Lateral line unarmed, a longitudinal keel along either side of the free portion of the tail. Air-bladder absent. Pyloric appendages dendritical.

Geographical Distribution. Temperate and tropical seas.

979. (1.) **Pelamys chiliensis.** (Fig. 73.)

Pelamys chiliensis, *Cuv. & Val. H. N. Poiss.* viii, p. 163; *Day, Fish. India*, p. 253, pl. lvi, fig. 1 (see synon.).

D. 18 | 3/13+viii. P. 24. V. 1/5. A. 3/12+vi. C. 20.

Length of head $3\frac{1}{2}$, caudal lobes 6, height of body $4\frac{3}{4}$ in the length from snout to middle of posterior edge of caudal fin. *Eyes*—diameter $8\frac{1}{4}$ in length of head, $2\frac{1}{2}$ diam. from end of snout, and 2 apart. Snout pointed. Angle of preopercle rounded, its lower border rather above $\frac{1}{2}$ the length of its vertical one. *Teeth*—in a single row in either jaw, with some rather large ones above the symphysis of the lower. *Fins*—dorsal spines weak, second to fourth subequal, about $\frac{4}{11}$ height of body and very slightly higher than the second dorsal fin, the anterior fin is continued nearly close up to the second. Pectoral $\frac{4}{9}$ length of head; ventral $\frac{3}{4}$ of

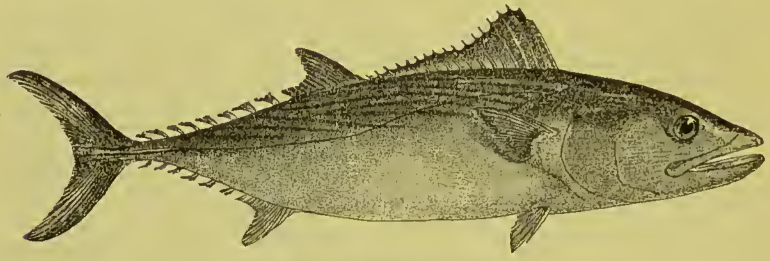

Fig. 73.—*Pelamys chiliensis.*

pectoral. Anal commences on the vertical below first dorsal finlet and is similar to second dorsal fin. *Scales*—forming a corselet anteriorly in three portions, separated by two deep emarginations; the corselet embraces the whole length of the first dorsal; the central portion is narrow and pointed, ending close to end of pectoral; the lower portion is small and just embraces the ventrals, which have a small scale between them. *Lateral line*—makes a low curve to below commencement of second dorsal fin, where it becomes straight. *Colour*—upper half of the body with about eight broad, straight, blue lines passing backwards and a little upwards, silvery below the lateral line, where, however, there are similar lines but very faint.

Hab. Seas of India to Japan and beyond.

4. Genus **CYBIUM**, Cuv.

Syn. *Apodontis* and *Apolectus*, Bennett; *Lepidocybium* and *Acanthocybium*, Gill.

Branchiostegals seven; pseudobranchiæ. Body somewhat elongate. Cleft of mouth deep. Teeth large and strong in the jaws; villiform on vomer, palatines, and tongue. Two dorsal fins, the first with feeble spines, extending to the commencement of the second, more rays in the second dorsal than spines in the first; seven or more finlets behind the second dorsal and anal fins. Scales, when present, rudimentary. A slight keel on either side of the tail. Air-bladder present.

Species of this genus, known as *seer-fishes* in India, when fresh and of the proper size, are amongst the most delicate marine forms for eating. If small, under a foot in length, they are dry, resembling *Trachynotus* and *Chorinemus*; from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet in length they are at their primest size, above this they become coarse.

Geographical Distribution. Atlantic and Indian Oceans.

Synopsis of Indian Species.

Sides without spots or blotches............	1. *C. kuhlii*, p. 209.
A. 2/17. Sides with about 3 horizontal rows of elongate spots	2. *C. interruptum*, p. 210.
A. 3/17–19. Sides with about 3 horizontal rows of elongate spots	3. *C. guttatum*, p. 210.
Sides with undulating vertical spots and lines.	4. *C. commersonii*, p. 211.
A. 5/14. Sides with several rows of elongate spots	5. *C. lineolatum*, p. 212.

980. (1.) **Cybium kuhlii.**

Cybium kuhlii, *Cuv. & Val. H. N. Poiss.* viii, p. 178; *Day, Fish. India*, p. 254, pl. lvi, fig. 2 (see synon.).

Nga-nyo-tha, Arracan.

D. 16 | 5–6/17–18 + viii. P. 29. V. 1/5. A. 4/18 + vii. C. 21.

Length of head $5\frac{1}{2}$ to 6, of caudal fin $3\frac{3}{4}$ to 4, height of body 5 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Preopercle emarginate along its vertical border, with the lower limb almost as long as the hind one. *Teeth*—conical and rather compressed, from 15 to 20 in either jaw, those in the lower much the larger; vomerine patch anteriorly rounded; a band along the palatines. *Fins*—first dorsal spines weak, second dorsal anteriorly $\frac{3}{4}$ height of body below it; there are six unarticulated rays at its commencement hidden in the skin; the anal, which commences on a vertical line below its middle, is similar to it but not so high. Pectoral as long as the head behind the middle of the eye. Ventrals $1\frac{1}{2}$ diameters of eye

in length. Caudal with deeply pointed lobes. *Lateral line*—containing about 200 plate-like rounded scales, each having a simple tube; straight until it arrives opposite middle or end of base of second dorsal, where it curves to below third finlet and then becomes rather wavy, its central keel well developed. *Colour*—bluish above, becoming silvery on the side and below. After death the sides assume a dark hue and have neither bands nor spots. First dorsal black; second dorsal and anal with dark bases; pectoral with a light outer edge, tips of caudal dark.

Hab. Seas of India. This fish attains a large size.

981. (2.) Cybium interruptum.

Cybium interruptum, *Cuv. & Val. H. N. Poiss.* viii, p. 172; *Day, Fish. India*, p. 254, pl. lvi, fig. 3 (see synon.).

Wingeram, Tel.; *Buk-ku*, Gwadar; *Towar*, Maráthi.

D. 16 | 4/15–16 + viii–ix. P. 21. V. 1/5. A. 2/17 + viii–ix. C. 21.

Length of head $5\frac{1}{4}$, of caudal fin 5, height of body $5\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Vertical limb of preopercle emarginate. *Teeth*—comparatively small, equal sized, conical and somewhat compressed, about 28 or 30 in the upper, and 24 rather larger ones in the lower jaw, placed close together; a patch, rounded anteriorly and slightly emarginate laterally, on the vomer, and a band along the palatines. *Fins*—dorsal spines weak; second dorsal commences midway between anterior nostril and base of caudal fin, it is $\frac{1}{2}$ height of body, its upper edge concave; anal commences below first third of second dorsal, which fin it resembles. *Lateral line*—with a gradual descent. *Colour*—bluish along the back, becoming white on the sides and below; three rows of elongated blotches along the sides, almost forming interrupted bands, the two upper sets of blotches cross the lateral line below the second or third finlet; first dorsal dark, its outer edge nearly black.

Hab. Seas of India. This species attains at least 3 feet in length.

982. (3.) Cybium guttatum.

Scomber guttatus, *Bl. Schn. Syst. Ich.* p. 23, fig. v.
Cybium guttatum, *Day, Fish. India*, p. 255, pl. lv, fig. 1 (young), and pl. lvi, fig. 4 (adult) (see synon.).

D. 16–17 | 4–5/14–15 + viii–x. P. 21. A. 3/17–19 + vii–ix. C. 26.

Length of head 5 to $5\frac{1}{3}$, of caudal fin $4\frac{1}{2}$ to 5, height of body 5 in the total length. *Eyes*—diameter $5\frac{1}{4}$ to $5\frac{1}{2}$ in length of head, 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Vertical limb of preopercle slightly emarginate. *Teeth*—lancet-shaped, laterally compressed, and somewhat wide apart, about 10 to 12 in either jaw, and frequently some smaller ones intercalated, they are much longer

in the lower jaw; a triangular patch on the vomer, and a band on the palatines. *Fins*—first dorsal spines weak and ending in soft points; second dorsal highest in front, where it is $\frac{4}{7}$ of the body below it, and has a concave upper edge; anal commences below first third of soft dorsal. *Lateral line*—having a very gradual descent, it becomes somewhat undulating opposite the commencement of the second dorsal, and very much so below the third and fourth finlets. The keel on the lateral line well developed. *Colour*—bluish above, silvery beneath; back and sides with three rows of round or rather horizontally oval spots, which become most apparent after death; the membrane between the first and eighth dorsal spines black, the rest pure white edged with black; in the young the first dorsal is occasionally almost wholly black.

Hab. Seas of India, Malay Archipelago, and China. Grows to 6 feet in length, is good eating, and salts well. These fish are captured in numbers from October throughout the cold months along all the Indian coasts.

983. (4.) Cybium commersonii. (Fig. 74.)

Scomber commersonii, *Lacép.* ii, p. 600, pl. 20, fig. 1.
Cybium commersonii, *Day, Fish. India*, p. 255, pl. lvi, fig. 5 (see synon.).

Chumbum, Mal.; *Konam*, *Mah-wu-laachi*, or *Ah-ku-lah*, Tam.

D. 16–17 | 3–4/13–14 + ix–x. P. 20–23. A. 2–3/12–13 + ix–x. C. 21.

Length of head 4 to 5, of caudal fin 5 to $5\frac{1}{2}$, height of body $5\frac{1}{2}$ to 7 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $1\frac{1}{2}$ apart. Posterior border of preopercle rather emarginate, and its angle rounded and slightly produced. *Teeth*—strong, conical, compressed laterally, those in the

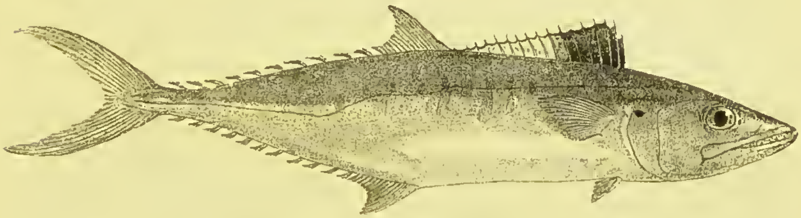

Fig. 74.—*Cybium commersonii.*

upper jaw varying in number from about 11 to 25, the posterior being rather the smallest. In the lower jaw there are from 10 to 15 of the same shape, but the posterior are the largest. A triangular group of villiform teeth on the vomer, and a long narrow band on the palatines. *Fins*—spines of the first dorsal weak, and ending in thin filamentous points that project beyond the membrane,

which is deeply notched. The second dorsal highest in front, with its upper margin concave; it is situated opposite the anal, which it resembles. Ventral small; pectoral pointed; caudal with pointed lobes, each with a raised soft oblique ridge along its base. *Lateral line*—at first in upper third of body; opposite the twelfth or thirteenth dorsal ray it bends down, and again descends abruptly opposite the first to the third pair of finlets, beyond which it passes direct to the centre of the caudal, where it ends in a soft raised keel between the bases of the lobes. *Colour*—bluish above, silvery below; first dorsal black to end of the seventh spine, behind which it is pure white, with a narrow black upper edge; basal half of pectoral black. After death numerous vertical undulating lines and spots appear on the sides; in the specimen figured (from Madras) they are very distinct, but during life they are rather indistinct.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least 4 feet in length.

984. (5.) Cybium lineolatum.

Cybium lineolatum, *Cuv. & Val. H. N. Poiss.* viii, p. 170; *Day, Fish. India*, p. 256 (see synon.)

D. 16 | 4/12+ix. P. 21. V. 1/5. A. 5/14+x. C. 15.

Length of head 5, of caudal 5, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ apart. *Teeth*—about 18 in either jaw, triangular and strongly compressed, the central ones in the lower being the largest; a triangular pointed patch on the vomer, and a band on the palatines. *Fins*—spines of first dorsal slender. Pectorals $8\frac{1}{2}$ in the total length; ventral $\frac{1}{3}$ of pectoral. *Lateral line*—at first in upper fourth of body, descends gradually towards end of second dorsal fin until it arrives below the fifth finlet. *Colour*—bluish above, silvery on sides and beneath; several rows of elongated black blotches on the body, three rows of them, like interrupted lines, below the lateral line.

Hab. Seas of India to the Malay Archipelago.

5. Genus ELACATE, Cuv.

Syn. *Meladerma*, Swainson.

Branchiostegals seven; pseudobranchiæ. Body fusiform; head depressed. Villiform teeth on the jaws, vomer, palatine bones, and tongue. The first dorsal reduced to a few free spines; the second with many rays and somewhat similar to the anal; no finlets. Scales very small. No keel on the side of the tail. Air-bladder absent. Pyloric appendages dendritical.

The young of this fish, in the seas of India, has its central caudal rays much prolonged; in a specimen $8\frac{1}{2}$ inches long the fin becomes more obtuse, but still the central rays are rather the longest; in a specimen of 12 inches the fin is obtuse, in another 11 inches long it is slightly emarginate; in the adult it becomes concave or almost lobed, the lower lobe being usually the longer.

985. (1.) Elacate nigra. (Fig. 75.)

Scomber niger, *Bloch, Ich.* t. 337.
Elacate nigra, *Day, Fish. India,* p. 256, pl. lv, fig. 2 (see synon.).

Sakala, Maráthi; *Cuddul verarl,* Tam.

D. 8/28-36. P. 21. V. 1/5. A. 2/25-29. C. 17. Vert. 12/13.

Length of head $4\frac{3}{4}$ to 5, of caudal fin $5\frac{1}{4}$ to 6, height of body $7\frac{1}{4}$ to 8 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{3}$ to 2 diam. from end of snout, and about 2 apart. Mouth wide. Greatest width of head equals its height. Upper surface of head flat and stellately rugose. *Fins*—dorsal free spines with a very short interspinous membrane; second dorsal highest

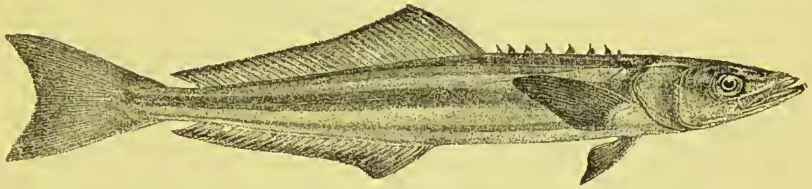

Fig. 75.—*Elacate nigra.*

anteriorly, where its rays are as high as the body, upper edge slightly concave. Anal similar to second dorsal, but rather lower, it arises on the vertical below 7th or 8th dorsal ray, its first two rays short and undivided. Pectoral $\frac{1}{2}$ longer than ventral. *Colour*—olivaceous brown, a dark band along back below base of dorsal fin and another along middle of side. Fins brownish, with dark or black edges. Outer edges of caudal lobes white.

Hab. Seas of India to Japan, also found in the tropical Atlantic and along the shores of the United States. There is a specimen 4 feet 12 inches in length in the Madras Museum. In March 1867 I took a female, 30 inches long, full of well-developed ova.

6. Genus ECHENEIS, Artedi.

Syn. *Remoropsis, Rhombochirus, Remilegia, Leptecheneis, Phtheirichthys,* Gill.

Branchiostegals seven or eight; pseudobranchiæ. Body elongate, fusiform; head depressed and furnished above with an adhesive organ. Eyes lateral or directed downwards and outwards. Cleft of mouth deep. Villiform teeth on the jaws, vomer, palatine bones, and generally on the tongue. The first dorsal fin modified into an adhesive disk; a long second dorsal and anal; no finlets; ventrals thoracic. Scales very small. No keel on the side of the tail. Air-bladder absent. Pyloric appendages in moderate numbers.

Geographical Distribution. These fishes appear to be inhabitants of nearly all seas. In those of India they are most commonly captured adhering to sharks, and are consequently considered to be

parasitic on those animals. Van Beneden (Bull. Ac. Belg. 1870, xxx, pp. 181–185) has shown that sometimes, at least, they prey upon fishes, but they belong to the commensal division of parasites, and merely profit by the greater powers of locomotion possessed by their host.

The shape of the caudal fin in these fishes changes with age, as in *Elacate*.

Synopsis of Indian Species.

Pairs of lamellæ in disk 21–25	1. *E. naucrates*, p. 214.
Pairs of lamellæ in disk 17–18	2. *E. remora*, p. 215.
Pairs of lamellæ in disk 15–16	3. *E. brachyptera*, p. 215.
Pairs of lamellæ in disk 12–13	4. *E. albescens*, p. 215.

986. (1.) Echeneis naucrates.

Echeneis naucrates, *Linn. Syst. Nat.* i, p. 446; *Day, Fish. India*, p. 257, pl. lvii, fig. 1 (see synon.).

Nachuk, Maráthi.

B. vii. D. 21–25*/33–41. P. 20. V. 1/5. A. 32–38. C. 17.

Length of head $5\frac{1}{3}$ to 6, of disk $4\frac{1}{4}$ to 5, of pectoral $7\frac{2}{3}$ to 8, of caudal fin 8, width between pectorals $10\frac{1}{4}$ to $11\frac{1}{2}$, height of body $11\frac{1}{2}$ to $12\frac{1}{2}$ in the total length. *Eyes*—transversely oval, $2\frac{1}{2}$ to 3 diameters in postorbital length of head, 2 to 3 from end of snout, and $3\frac{1}{2}$ to $4\frac{1}{2}$ apart above. The disk is about $\frac{2}{5}$ as wide as long, and contains from 21 to 25 transverse laminæ, each having a tooth-like posterior margin, whilst along the central line there runs a smooth elevation, so that the vacuum may be confined to one half the disk. The anterior laminæ are directed slightly forwards; those in the second quarter of the disk are nearly transverse, and the posterior slant backwards, the change in direction being very gradual. Outside the disk is a wide fleshy membrane, which extends behind to over the occiput, but does not reach forward as far as the end of the upper jaw. Maxilla extending to beneath the third lamina in a specimen $2\frac{1}{2}$ feet in length. Mandible pointed and covered above with numerous rows of villiform teeth, forming a triangular toothed space in front of the pointed upper jaw. *Fins*—second dorsal and anal opposite each other, both highest in front, where the rays are $\frac{4}{9}$ to $\frac{3}{8}$ length of disk; outer edge of both fins rather concave, and the last rays slightly produced. Caudal with its posterior margin straight, but having four short notches at its extremity. *Lateral line*—rather undulating. *Colour*—generally brownish grey, external margins of caudal and anterior tips of dorsal and anal fins edged with white; pectoral deep brown; anal tipped with dark brown; centre of caudal nearly black. Sometimes a blackish band along middle of side.

Hab. Tropical and temperate seas generally; attaining at least 3 feet in length; this is the commonest form in the Indian seas.

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* The first figures under D. in the fin formula of this genus represent the number of pairs of lamellæ in the disk.

987. (2.) Echeneis remora.

Echeneis remora, *Linn. Syst. Nat.* i, p. 446; *Day, Fish. India*, p. 258 (see synon.).

B. vii. D. 17–18/22–24. A. 24–25. Cæc. pyl. 6. Vert. 12/15.

Length of head $4\frac{1}{3}$, of disk $3\frac{1}{4}$, of caudal fin 6, height of body 9, breadth between pectoral fins 6 to 7, length of pectorals $7\frac{3}{4}$, of ventrals $8\frac{1}{4}$ in the total length. *Eyes*—in middle of length of head, $3\frac{1}{2}$ diameters from end of snout, and 5 apart superiorly. Mouth rounded. *Teeth*—the outer lateral row in the lower jaw enlarged. *Fins*—greatest width of disk equals half its length; second dorsal commences midway between base of pectoral and base of caudal, its highest rays are as long as the head excluding the snout. Anal opposite second dorsal. Caudal forked in a specimen 9 inches long. *Colour*—brown.

Hab. Seas of temperate and tropical regions.

988. (3.) Echeneis brachyptera. (Fig. 76.)

Echeneis brachyptera, *Lowe, P. Z. S.* 1839, p. 89; *Day, Fish. India*, p. 258, pl. lv, fig. 3 (see synon.).

B. vii. D. 15–16/26–32. P. 20. V. 1/5. A. 24–27. C. 17.

Length of head $4\frac{1}{2}$, of disk alone $4\frac{1}{8}$, of caudal fin $6\frac{1}{3}$, height of body $8\frac{1}{4}$, width at pectorals $6\frac{2}{3}$ to $7\frac{1}{2}$, length of pectoral 10, of ventral $7\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{4}$ in postorbital portion of head, $2\frac{1}{2}$ diam. from end of snout, $3\frac{1}{2}$ apart above. Upper jaw rather angular; the maxilla reaches to beneath fourth lamina of disk. *Teeth*—outer lateral row in lower jaw somewhat enlarged.

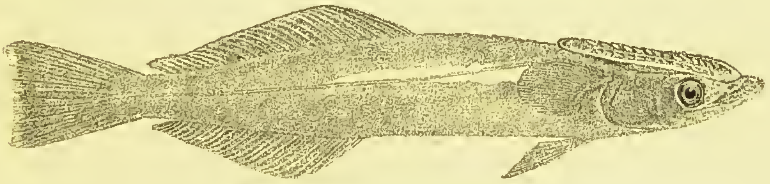

Fig. 76.—*Echeneis brachyptera.*

Fins—greatest width of disk equals half its length; the second dorsal commences midway between posterior edge of eye and base of caudal, highest portion equals postorbital length of head. The anal commences on vertical below the third or fourth dorsal ray, to which fin it is similar. Caudal very slightly emarginate. *Colour*—light brown, with posterior edge of caudal whitish.

Hab. Seas of India to China, also in the Atlantic.

989. (4.) Echeneis albescens.

Echeneis albescens, *Temm. & Schleg. Faun. Japon., Poiss.* p. 272, pl. 120, fig 3; *Day, Fish. India*, p. 258, pl. lvii, fig. 2 (see synon.).

B. vii. D. 12-13/17-22. P. 19. V. 1/5. A. 19-22. C. 15.

Length of head $4\frac{3}{4}$, of disk 4, width of body between pectorals $5\frac{1}{4}$, of caudal $8\frac{1}{4}$ in the total length. *Eyes*—$2\frac{1}{2}$ diameters in postorbital portion of head, $2\frac{1}{4}$ from end of snout, 6 apart above. Body wide anteriorly, width of disk equals $\frac{4}{5}$ of length. Mouth obtuse; lower jaw the longer, the maxilla reaches to below third lamina of disk. *Teeth*—an outer enlarged series in lower jaw and vomer. *Fins*—second dorsal commences in second third of distance between bases of pectoral and caudal fins and opposite anal. Ventral as long as distance between eye and base of pectoral. Caudal very slightly emarginate. *Colour*—uniform brown.

Hab. Seas of India, Japan, and the Cape.

Family XXI. URANOSCOPIDÆ.

Koraké, Tamil.

Body low and more or less cylindrical. Gill-openings wide. Eyes on upper surface of head. Head mostly cuirassed with bony plates. Infraorbital ring of bones does not articulate with the preopercle. Usually villiform teeth in both jaws, canines present or absent. One or two dorsal fins, the spines fewer in number than the rays. Ventral with one spine and five rays. Pectoral rays branched. No prominent papilla near the vent. Scales when present rudimentary. Lateral line continuous. Air-bladder absent. Pyloric appendages when present few or in moderate numbers.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

Two dorsal fins .... 1. URANOSCOPUS.
A single dorsal fin .... 2. ICHTHYSCOPUS.

1. Genus URANOSCOPUS, Cuv.

Syn. *Nematagnus*, Gill.

Branchiostegals six; pseudobranchiæ. Head large, broad, and partly covered with bony plates. The opercles and shoulder-bones usually armed. Besides the posterior gill-opening there is generally a rounded orifice above the opercle. Cleft of mouth vertical, with a filament below or before the tongue. Villiform or cardiform teeth on the jaws, vomer, and palatine bones; no canines. Two dorsals, the first with from three to five spines; ventrals jugular. Scales small and rudimentary. Air-bladder absent. Pyloric appendages in moderate numbers.

Geographical Distribution. Indo-Pacific, Mediterranean, and Atlantic.

990. (1.) **Uranoscopus guttatus.** (Fig. 77.)

Uranoscopus guttatus, *Cuv. & Val. H. N. Poiss.* iii, p. 305; *Day, Fish. India,* p. 260, pl. lv, fig. 4 (see synon.).

D. 4-5/12-13. P. 17. A. 13. C. 13.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—$\frac{1}{2}$ diameter from end of snout and $1\frac{1}{4}$ apart. Greatest width of head rather exceeds its height. Lips with a narrow fringe; nostrils situated in front of the centre of the eye. Four to seven spines along lower edge of preopercle, and one on subopercle. Two large spines on shoulder-bone, the lower the larger and as long as 2 diameters of orbit. Posterior border of occiput with one central and on each side two little bony lobes, the posterior lateral lobes with one or two spines. Bones of the head roughened. *Fins*—dorsal spines weak, first longest, but only $\frac{2}{3}$ as high as soft dorsal. Caudal rather rounded. *Scales*—present on

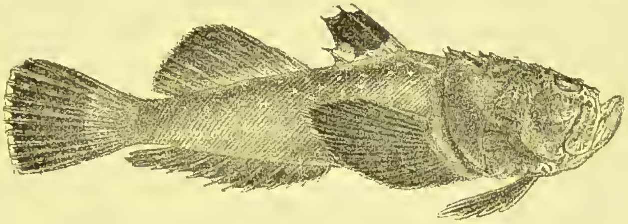

Fig. 77.—*Uranoscopus guttatus.*

body, except above first part of lateral line, and on breast and chest to commencement of anal; they are not imbricate but are covered by skin, and in rows bounded by muciferous channels. *Lateral line*—from shoulder to base of second dorsal, along which it is continued, it has a few rounded scales above it behind base of second dorsal spine. *Colour*—chestnut or slaty brown, with two or three rows of bluish-white spots along the back and halfway down the sides. First dorsal pure white, with its upper two thirds black, from the first to midway between the third and fourth spines, or in large examples to the fourth; second dorsal black along the upper two thirds; caudal with a wide vertical black band covering its middle third; anal white with a black base; pectoral dark, its lower margin edged with white.

Hab. Seas of India, said to attain a foot in length; I have obtained it from Madras up to 10 inches in length.

2. Genus **ICHTHYSCOPUS**, Swainson.

Syn. *Uranoscopus*, sp., Cuv. & Val.; *Upselonphorus*, Gill; *Kathetostoma* and *Anema*, Günther (=*Genyagnus*, Gill, =*Gnathagnus*, Gill, =*Lynnema*, Haast); *Astrocopus*, Brev. (=*Agnus*, Günther).

Branchiostegals six; pseudobranchiæ. Body somewhat cylindrical. Head large, broad, and partly covered with bony plates.

Gill-openings without any superior orifice. Cleft of mouth vertical. Some of the bones of the head may be armed. No filament below or before the tongue. Villiform teeth on upper jaw, vomer, and palatines, a single conical row in the lower jaw. One continuous dorsal fin, with fewer spines than branched rays; ventrals jugular. Scales rudimentary. Air-bladder absent. Pyloric appendages in moderate numbers.

991. (1.) **Ichthyscopus inermis.** (Fig. 78.)

Uranoscopus inermis, *Cuv. & Val. H. N. Poiss.* iii, p. 310, pl. 65.
Ichthyscopus inermis, *Swainson, Lardner's Cab. Cycl., Fishes, &c.* ii, p. 269; *Day, Fish. India*, p. 261, pl. lv, fig. 5 (see synon.).

Nillum koranjan, "A diver into the mud," Tam.

D. 8 | 3–4/16–18. P. 18. A. 16–19. C. 11. Cæe. pyl. 9 (8).

Length of head 3 to $3\frac{1}{4}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—situated considerably before middle of head. Greatest width of head equals $\frac{3}{4}$ of length. Lips covered with numerous branched papillæ. Anterior nostril round, situated in front of the centre of the eye and surrounded with papillæ resembling those on the lips, similar papillæ surround the large oval posterior nostril on inner side of orbit. No spines on head or shoulder; posterior edge of opercle fringed. An elongate angular flap edged with papillæ behind the shoulder. *Fins*—dorsal spines weak, and not so high as the rays. Caudal slightly

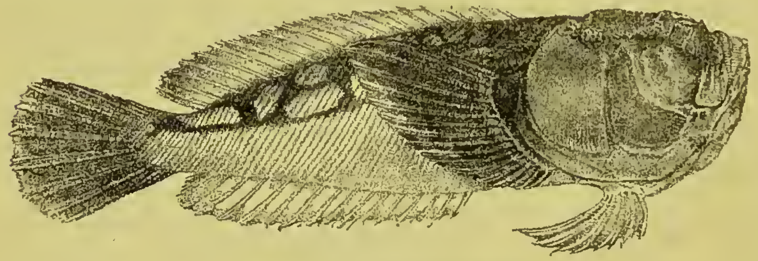

Fig. 78.—*Ichthyscopus inermis.*

rounded. *Scales*—present on the body, except above the lateral line, on the breast, chest, and to about the sixth anal ray; they are not imbricate but are covered by the skin, and in rows, each bounded by a muciferous channel. *Lateral line*—from shoulder to base of third dorsal spine, and continued close to the base of dorsal in its whole length. *Colour*—canary-yellow, with buffy-brown markings along the sides, enclosing pure white round or oval spots, also some white spots on pectoral and dorsal fins. Upper surface of head brownish; caudal brownish yellow with dark extremities, a dark bar across pectoral and caudal fins.

Hab. Seas and estuaries of India to Japan, said to live in the mud and be taken with difficulty; attaining to at least 2 feet in length.

Family XXII. TRACHINIDÆ.

Body more or less elongate, posteriorly compressed; head often large. Some bones of the head usually armed; the suborbital ring of bones does not articulate with the preopercle. Teeth in the jaws, present or absent on the vomer and palatines. Dorsal fins sometimes in two distinct portions but more or less connected; anal generally similar to the soft dorsal; ventrals thoracic; pectorals with or without appendages. Air-bladder present or absent. Pyloric appendages few.

Geographical Distribution. Almost world-wide.

Synopsis of Indian Genera.

First dorsal with 4 or 5 spines. Ventrals a little anterior to pectorals .... 1. PERCIS.
First dorsal with 9 to 12 spines. Ventrals not anterior to pectorals .... 2. SILLAGO.

1. Genus **PERCIS**, Bl. Schn.

Syn. *Parapercis*, Bleeker.

Branchiostegals six; pseudobranchiæ. Body subcylindrical; head a little depressed. Eyes lateral, directed somewhat upwards. Cleft of mouth slightly oblique; lower jaw the longer. Opercle with one or two spines; pre- and subopercles sometimes slightly serrated. Villiform teeth in the jaws, with an outer enlarged row some of which are canine-like; teeth also on the vomer, but not on the palatines. The first dorsal fin with four or five spines, more or less continuous with the second dorsal, which has a moderate number of rays and is similar to the anal; ventrals slightly anterior to the pectorals, the rays of which are branched. Scales ctenoid, rather small. Air-bladder absent. Pyloric appendages, when present, few.

Geographical Distribution. Red Sea, Indian and tropical Pacific Oceans, seas of India to the Malay Archipelago and beyond.

Synopsis of Indian Species.

L. tr. 5/16. Caudal slightly rounded .... 1. *P. punctata*, p. 219.
L. tr. 5/18. Caudal cut square, with its upper ray a little prolonged .... 2. *P. pulchella*, p. 220.
L. tr. 7/21 .... 3. *P. hexophthalma*, p. 221.
L. tr. $2\frac{1}{2}/9$ .... 4. *P. cylindrica*, p. 221.

992. (1.) **Percis punctata.** (Fig. 79.)

Percis punctata, *Cuv. & Val. H. N. Poiss.* iii, p. 264; *Day, Fish. India*, p. 262, p. lviii, fig. 1 (see synon.).

Kul ooloova, Tam.

D. 5/21–22. A. 2/17–18. C. 15. L. l. 58–60. L. tr. 5/16.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 7 to $7\frac{1}{2}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $\frac{1}{4}$ apart. Snout sharp. Greatest depth of preorbital equals half the diameter of the eye. Preopercle coarsely serrated along its posterior border; edge of subopercle serrated. A shoulder-spine. *Teeth*—above the symphysis of the lower jaw an outer enlarged row of about eight curved teeth, the outermost of which are the largest. *Fins*—spines of first dorsal of moderate strength, the fourth longest and $1\frac{1}{3}$ diameter of eye in length, the third a quarter shorter; ventral

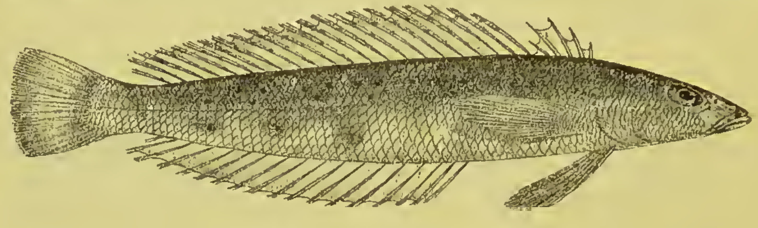

Fig. 79.—*Percis punctata.*

reaches the vent. Caudal cut square or a little rounded. *Colour*—whitish, with reddish-brown vertical bands and blotches above the lateral line, which are interrupted along the middle of the body; on these bands are a few black spots. A bright golden line from below orbit to base of dorsal fin, and another from centre of eye to snout. Spinous dorsal with or without a row of black spots; soft dorsal with three rows on the rays; caudal with two greyish bands, one at its base, the other on its posterior third, and sometimes an ocellus at upper part of base; anal yellowish; ventrals slate-coloured.

Hab. Coromandel coast of India and ? Ceylon; attaining at least 5 inches in length.

993. (2.) Percis pulchella.

Percis pulchella, *Temm. & Schleg. Fauna Japon., Poiss.* p. 24, pl. 10, fig. 2; *Day, Fish. India,* p. 263, pl. lviii, fig. 2 (see synon.).

Varna natiooli, Tam.

D. 5 | 21–22. P. 18. A. 1/17. C. 17. L. l. 60–62. L. tr. 5/18.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, of caudal fin 7, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Snout not so pointed as in *P. punctata.* Greatest depth of preorbital equals half diameter of eye. Preopercle entire; subopercle with two or three serrations just below the opercle. *Teeth*—anterior row in front of both jaws enlarged; there are some enlarged teeth laterally in the mandibles. *Fins*—spines of first dorsal rather strong, first short, fourth longest and equal to diameter of eye, the fifth about equals the

second. Ventral does not quite reach the vent. Caudal cut square, with its upper ray a little prolonged. *Colour*—reddish, with six darker cross bands; a light pinkish band along side, becoming yellow along centre of caudal fin; head spotted with dark purplish-black marks above; three well-marked vertical blue bands across the sub- and interopercles, and sometimes a fourth crosses the breast in front of and below the pectoral fin. Dorsal fins yellow, black in their lower halves; the soft dorsal with a single row of spots along its upper half; anal yellowish in its lower two thirds, with five rows of round canary-coloured spots; its outer third reddish; ventrals reddish, stained at their edges. Caudal yellow along the middle, dark reddish in its lower, some fine vertical bars in its upper half.

Hab. East coast of Africa, seas of India to Japan.

994. (3.) Percis hexophthalma.

Percis hexophthalma *(Ehrenb.)*, *Cuv. & Val. H. N. Poiss.* iii, p. 271, vii, p. 507; *Day, Fish. India*, p. 263, pl. lvii, fig. 4 (see synon.).

D. 5 | 19–21. P. 17. A. 17–18. C. 15. L. l. 62. L. tr. 7/21.

Length of head 4, of caudal fin $6\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly $\frac{2}{3}$ apart. Snout somewhat pointed. Greatest depth of preorbital equals 1 diameter of eye. Preopercle entire; a spine at shoulder. *Teeth*—outer row in upper jaw enlarged, as are also 8 or 10 of the anterior ones in the lower jaw, also four or five of the outer ones in the middle of the lateral teeth. *Fins*—fourth dorsal spine longest and equal to 1 diameter of the orbit. Ventral reaches anal. Caudal cut square, having its upper ray a little prolonged. *Colour*—upper half of body and head greyish brown with irregular vertical grey lines, also one or two narrow and interrupted or entire lines along the side; three or more white spots, each having a black centre, along either side of the abdomen. Some narrow dark lines pass obliquely backwards and downwards from the eye over the sides of the head, others go directly backwards. A black spot on base of first dorsal, edges of fin also dark; three rows of black spots along the dorsal, which also has a dark edge, one row of spots along the anal. A large black blotch on the caudal extending half its length, and having a large white blotch behind it, the whole of the fin vertically barred with spots.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

995. (4.) Percis cylindrica.

Sciæna cylindrica, *Bloch, Ich.* t. 299, fig. 1.
Percis cylindrica, *Cuv. & Val. H. N. Poiss.* iii, p. 267; *Günther, Catal.* ii, p. 239; *Day, P. Z. S.* 1888, p. 260; *Fish. India, Suppl.* p. 790.

D. 5/21. P. 15. V. 1/5. A. 17-18. C. 15. L. l. 44. L. tr. $2\frac{1}{2}$/9.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. The greatest depth of the preorbital equals one third diameter of eye. All the opercles entire; a well-marked spine on the opercle and another on the suboperele, no shoulder-spine. *Teeth*—two enlarged ones on either side, above the symphysis of the lower jaw; fine ones on the vomer. *Fins*—second dorsal spine longest, equalling three fourths diameter of eye. Ventral one fourth longer than head, reaching base of seventh anal ray. Caudal slightly rounded. *Colour*—reddish brown, with five wide and dark vertical bands, extending from the back to the lower surface, these bands being darkest at their edges and disappearing about the middle of the body, where there are also some dark spots. A brown ocellus at upper part of base of caudal fin, which has some brown spots on it. Numerous brown spots on snout and upper surface of head and cheeks, some on upper edge of eye, where there are two dark narrow bands. Ventrals white. First dorsal fin nearly black between the spines; soft dorsal and anal with fine dots between the rays.

Hab. Andamans. Two small specimens received.

2. Genus **SILLAGO**, Cuv.

Syn. *Sillaginodes* and *Sillaginopsis*, Gill.

Branchiostegals six; pseudobranchiæ. Body elongate, somewhat cylindrical. Head conical, with its muciferous system well developed. Gill-openings wide, eyes lateral or directed slightly upwards. Cleft of mouth short; the upper jaw the longer. Villiform teeth in the jaws with the outer row rather conical; also present on vomer, none on the palatines. Two dorsal fins, the first with nine to twelve spines; soft dorsal similar to anal; ventrals thoracic, with one spine and five rays; lower pectoral rays branched. Scales ctenoid. Lateral line not continued on to the caudal fin. Air-bladder simple. Pyloric appendages few.

These fishes have much the appearance of *Sciæna* and were placed in that genus by Bloch; they are esteemed light and wholesome food; as they ascend rivers and tidal estuaries, they may be captured almost throughout the year.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago and Australia.

Synopsis of Indian Species.

A. Second dorsal spine very elongate, eye $3\frac{1}{2}$ to 4 diam. from end of snout. . . . . 1. *S. panijus*, p. 223.

B. Second dorsal spine not exceeding height of body.
- Second and third dorsal spines longest. . . . . 2. *S. sihama*, p. 224.
- Third, fourth, and fifth dorsal spines longest. 3. *S. maculata*, p. 224.

996. (1). Sillago panijus. (Fig. 80.)

Cheilodipterus panijus, *Ham. Buch. Fish. Ganges*, pp. 57, 367; *Day, Fish. India, Suppl.* 1888, p. 791.
Sillago domina, *Day, Fish. India*, p. 264, pl. lviii, fig. 3 (see synon.).
Yurra-soring, Tel.; *Tool-danti*, Ooriah; *Nya-roén*, Arracan; *Soondra*, Chittagong; *Nya-pulwey*, Burmese.

D. 9 | 1/25-27. P. 24. A. 1/26-27. L. l. 90. L. tr. 5-6/14. Cæc. pyl. 4.

Length of head $3\frac{3}{4}$ to 4, of pectoral 6, of caudal fin 7 to 8, height of body 7 to 8 in the total length. *Eyes*—$3\frac{1}{2}$ to 4 diameters from end of snout, and $1\frac{1}{2}$ to 2 apart. Body subcylindrical. Head depressed, pryiform; cheeks swollen. Greatest width of head equals $\frac{4}{9}$ and its height $\frac{3}{7}$ of its length; upper jaw the longer; opercle with a very small spine; preopercle entire. *Teeth*—the largest

Fig. 80.—*Sillago panijus.*

(four) in the centre of the upper jaw. A transverse semicircular villiform band on the vomer. *Fins*—dorsal commences slightly behind pectoral; first dorsal spine short, second of varying length, but in large specimens usually extending to base of caudal fin; there are some fine scales on the interspinous membrane between it and the third spine. Second dorsal a little the highest in front, where it equals $\frac{2}{3}$ height of body; pectoral rounded. First two rays of anal undivided and with articulated extremities, form of fin similar to that of the second dorsal; caudal lobed, the upper lobe the longer. *Scales*—in regular horizontal rows, extending over cheeks and between the eyes, as far forward as the anterior nostril; some fine ones over the base of the pectoral and nearly to the extremity of caudal. *Lateral line*—desends very gently to about opposite seventh anal ray, whence it proceeds direct to middle of tail. *Colour*—greenish yellow shot with purple.

Hab. Coromandel coast of India, where it is caught in shoals in October, also in the Ganges, in Burma, and in the Malay Archipelago; attaining at least 10 inches in length.

997. (2.) Sillago sihama.

Atherina sihama, *Forsk. Descr. Anim.* p. 70, no. 102.
Sillago sihama, *Günther, Catal.* ii, p. 243; *Day, Fish. India*, p. 265, pl. lvii, fig. 3 (see synon.).

Nudadi, Maráthi; *Soring*, or *Tella-soring*, *Arriti-ki*, Tel.; *Culingah*, Tam.; *Cudeerah*, Mal.; *Thol-o-dah*, And.; *Nga-rui*, Mugh; *Nga-pullovey*, Burmese.

D. 10-11 | 1/20–23. A. 1/22–23. L. l. 70–74. L. tr. 5–6/12. C. p. 3–4.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 8 to 9, height of body 6 to $7\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, $1\frac{1}{3}$ to $2\frac{1}{4}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Snout pointed. Greatest width of head equals its height or half of its length. Upper jaw slightly the longer. Vertical limb of preopercle serrated in its lower half. Opercle with a well-developed spine. *Teeth*—in a semicircular band on the vomer. *Fins*—dorsal spines of moderate strength, second and third subequal in length and as high as the body below them; second dorsal highest anteriorly, where it equals $\frac{4}{7}$ height of body. Anal below soft dorsal, and similar but not so high. Caudal emarginate or obtuse. *Air-bladder*—extends posteriorly to opposite the first third of the anal fin. *Colour*—olive-green along the back, becoming light on the abdomen, the whole having a brilliant purple reflexion; a silvery longitudinal band; minute black points on the dorsal and anal fins.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; ascending tidal rivers. This fish is known as *Whiting* at Madras. It attains a foot in length.

998. (3.) Sillago maculata.

Sillago maculata, *Quoy & Gaim. Voy. Uranie et Phys., Zool.* p. 261, pl. 53, fig. 2; *Day, Fish. India*, p. 265, pl. lviii, fig. 4. (see synon.).

D. 11 | 1/19–20. P. 17. A. 1/20–21. C. 18. L. l. 70. L. tr. 6/10.

Length of head $3\frac{3}{4}$, of caudal fin $7\frac{1}{3}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head $\frac{4}{7}$ and its height $\frac{2}{3}$ of its length. Snout rather pointed, upper jaw a little the longer. Vertical limb of preopercle finely serrated; opercle with a small spine. *Fins*—dorsal spines weak, third to fifth subequal in length, nearly as high as body, and rather higher than soft portion of fin. Anal similar to second dorsal. Caudal lobed. *Colour*—greyish along the back, becoming dull white on the abdomen; some irregular blackish blotches along the sides, also a silvery median longitudinal band. Upper half of first dorsal black, outer edges of second dorsal and anal dark, and a grey band along the upper third of soft dorsal.

Hab. Andamans, Malay Archipelago to South-east Australia. Said to attain 8 or 9 inches in length.

Family XXIII. PSEUDOCHROMIDES.

Body more or less elongate. Cleft of mouth oblique. Bones on the head unarmed (opercle sometimes obtusely pointed); head not cuirassed. The suborbital ring of bones articulates with the preopercle. Teeth in the jaws, present or absent on the vomer and palatines. Dorsal fin consisting of two portions which are connected; usually more rays than spines; anal similar to, or of less extent than, the soft dorsal; ventrals thoracic or jugular; pectorals without appendages. Scales feebly cycloid or ctenoid. Lateral line interrupted or incomplete. Air-bladder present or absent. Pyloric appendages, when present, in small numbers.

Synopsis of Indian Genera.

Cleft of mouth large. Palate edentulous.
  Scales cycloid. Lateral line incomplete. 1. OPISTHOGNATHUS,
Lower jaw the longer. Teeth in jaws,
  vomer, and palate. Scales ctenoid.
  Lateral line interrupted .... 2. PSEUDOCHROMIS.

1. Genus **OPISTHOGNATHUS**, Cuv.

Syn. *Gnathypops*, Gill.

Branchiostegals six; pseudobranchiæ. Body rather compressed behind. Upper profile of snout parabolic. Eyes lateral, large. Cleft of mouth deep, the upper jaw being either produced in a styliform process to beyond the angle of the preopercle, or truncated a little behind the level of the hind edge of the eye. Fine teeth in jaws, with an outer enlarged row; palate edentulous. Dorsal spines weak and flexible (10–13), rays (13–17) similar to those of the anal; anal with two flexible spines; ventrals jugular; pectoral rays branched. Scales cycloid, small. Lateral line not continued so far as the caudal fin. Air-bladder small. Cæcal appendages absent.

Geographical Distribution. Red Sea, seas of India to Malay Archipelago and beyond; also Brazil.

Synopsis of Indian Species.

D. 14/12. Maxilla produced backwards
  to beyond angle of preopercle .... 1. *O. nigromarginatus*, p. 226.
D. 10/14. Maxilla truncated, reaching
  to just behind posterior edge of eye. 2. *O. rosenbergii*, p. 226.

999. (1.) **Opisthognathus nigromarginatus.** (Fig. 81.)

Opisthognathus nigromarginatus, *Rüppell, Atl. Fische*, p. 114, t. xxviii, fig. 4; *Day, Fish. India*, p. 266, pl. lvii, fig. 5 (see synon.).

D. 14/12. P. 20. A. 16–18. C. 12.

Length of head 4, of caudal 9 to 10, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. Snout obtuse; the maxilla is elongate and its posterior extremity reaches to the base of the pectoral fin, it has a membranous connexion with the cheek. Opercles entire. *Fins*—dorsal spines weak, not quite so high as

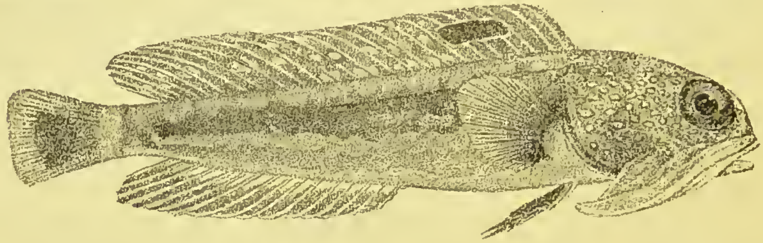

Fig. 81.—*Opisthognathus nigromarginatus.*

the rays. Pectoral $\frac{4}{9}$ length of head; ventral slightly longer; caudal rounded. *Lateral line*—ceases below middle of dorsal fin. *Colour*—yellowish marbled with brown, inside of upper jaw with two deep bluish bands on a white ground, one of which shows along the upper edge of the maxilla. Dorsal fin with a dark blue ovate spot between its fourth and eighth spines, cloudy marks and spots throughout the fin; base of anal light coloured, externally dark.

Hab. Red Sea; seas of India.

1000. (2.) **Opisthognathus rosenbergii.**

Opisthognathus rosenbergii, *Bleeker, Batavia Nat. Tijdsch.* xii, p. 220; *Day, Fish. India*, p. 267, pl. lviii, fig. 5 (see synon.).

Natsooli, Tam.

D. 10/14. P. 21. A. 2/14. C. 12. L. l. 76.

Length of head $4\frac{1}{4}$, of caudal $6\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{6}$ apart. Snout obtuse; the maxilla (length of which equals that of postorbital portion of head) reaches to rather beyond vertical from hind edge of eye, it is truncated and does not nearly extend to angle of preopercle. Opercles entire. *Fins*—dorsal spines weak, and not so high as the rays. Pectoral as long as the head behind the eye; ventral reaches more than halfway to vent. Caudal rounded. *Scales*—about 26 rows below lateral line to commencement of anal fin, none above it so far as end of

spinous dorsal. *Lateral line*—on raised scales, smaller than those on the body, the tubes are short and unbranched. *Colour*—appears to vary somewhat: one from Madras has the body somewhat blotched, the dorsal and anal fins edged with black, and four large black blotches on the lower two thirds of that fin; ventrals black. In a drawing amongst Sir W. Elliot's collection the dorsal and caudal are blacker, with five white bands on the former, and two white spots on the latter fin. Bleeker's figure shows five black blotches along the lower half of the dorsal fin, and the caudal white with two wide black bands.

Hab. Seas of India to the Malay Archipelago; probably a small species, and apparently rare.

2. Genus **PSEUDOCHROMIS**, Rüpp.

Syn. *Labristoma*, Swains.; *Leptochromis*, Bleeker.

Branchiostegals six; pseudobranchiæ. Body rather elongate and compressed. Eyes lateral. Cleft of mouth slightly oblique, lower jaw the longer. Jaws with a single row of teeth laterally, an outer enlarged row anteriorly in premaxillaries, canines in the lower jaw; teeth on vomer and palate. A single dorsal fin having a few (2–7) spines anteriorly; pectoral rays branched; ventrals thoracic. Scales of moderate size. Air-bladder present. Pyloric appendages absent.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago.

1001. (1.) **Pseudochromis fuscus.** (Fig. 82.)

Pseudochromis fuscus, *Müll. & Trosch. Hor. Ich.* 1849, iii, p. 23, t. iv, fig. 2.

Pseudochromis xanthochir, *Bleeker, Batavia Nat. Tijdsch.* viii, p. 443; *Day, Fish. India*, p. 267, pl. lviii, fig. 6, *Suppl.* p. 791 (see synon.).

D. 3/26. P. 17. V. 1/5. A. 3/15. C. 17. L. l. 41. L. tr. 3–5/14.

Length of head $3\frac{2}{3}$, of caudal $5\frac{1}{4}$, height of body $3\frac{2}{3}$ in the

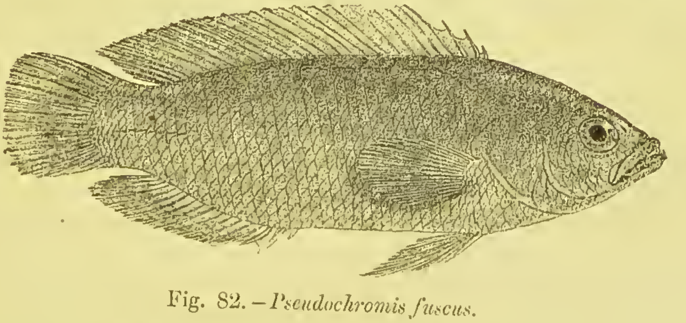

Fig. 82.—*Pseudochromis fuscus.*

total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Preopercle slightly crenulated

at its angle. *Fins*—dorsal spines short, third the longest, and about half as high as first ray, the first 11 to 15 rays unbranched; end of fin rather pointed. Caudal rounded. *Scales*—finely ctenoid. *Colour*—dull olive, upper half of soft dorsal with numerous yellow spots, the outer half of anal with brown ones. Caudal yellow in its last half, its base with brown spots between the rays.

Hab. Andaman Islands, where this species is not rare, to perhaps the Philippines.

Family XXIV. BATRACHIDÆ.

Pediculati, pt., Cuv.

Branchiostegals six; pseudobranchiæ present. Body low and more or less elongate; head large; the muciferous system well developed. Gills three. The gill-openings narrow, in the form of a slit before the pectoral fin. Opercles armed. Teeth conical and of moderate size or small. First dorsal with few spines; the second and the anal with many rays; ventral with two rays, jugular. Scales, when present, small. Air-bladder present.

Geographical Distribution. Coasts of tropical and temperate regions.

These carnivorous fishes apparently delight in mud and dirty water; they frequent the shores, ascending tidal rivers and estuaries. At Pinang "the natives attribute poisonous qualities to these fishes, and reject them even as manure" (Cantor, Catal. p. 206). They are, however, eaten at Bombay by the poorer classes. Dr. Günther has described a species of *Thalassophryne* (belonging to this family) from the Pacific coast of Panama (P. Z. S. 1864, p. 155), possessing "as perfect a poison-organ as that of the venomous serpents. Each operculum terminates in a long spine similar to the two dorsal spines: each spine is perforated at the extremity and at the base, and has a canal in its interior. The canal leads to a sac at the base of each spine, in which a considerable quantity of the poisonous substance was found; on the slightest pressure it flowed freely from the opening of the spine." (Zool. Record, 1864, p. 155.)

1. Genus **BATRACHUS**, Bl. Schn.

Body anteriorly somewhat cylindrical, and posteriorly compressed; head broad, depressed. Gill-openings narrow. Eyes lateral. Gape of mouth wide. Gill-covers with several spines. Teeth on jaw, vomer, and palate. No distinct canines. First dorsal with three strong spines. Scales, if present, very minute. Air-bladder divided into two lateral parts. Pyloric appendages absent. Vertebræ 12/17–27.

Geographical Distribution. That of the family.

Cantor observed that these fishes live some period after removal from the water.

Synopsis of Indian Species.

Eyes 1 diam. from end of snout; a foramen in axilla. 1. *B. grunniens*, p.229.
Eyes 3 diam. from end of snout; no foramen in axila. 2. *B. gangene*, p. 229.

1002. (1.) Batrachus grunniens. (Fig. 83.)

Cottus grunniens, *Bloch, Ich.* t. 179.
Batrachus grunniens, *Bl. Schn. Syst. Ich.* p. 43; *Day, Fish. India* p. 269, pl. lix, fig. 1 (see synon.).

Nga owk, Arracan; *Beng muchee*, Chittagong.

D. 3 | 20–22. P. 21. V. 1/2. A. 15–18. C. 15.

Length of head $3\frac{1}{2}$, of caudal $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter 5 in length of head, nearly 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Head depressed, its greatest width equals its length behind the middle of the eyes. Gill-covers with four backwardly directed spines, two on the opercle and two on the subopercle, the lower of these last being often indistinct (*B. trispinosus*), sometimes only two spines are visible on each gill-cover.

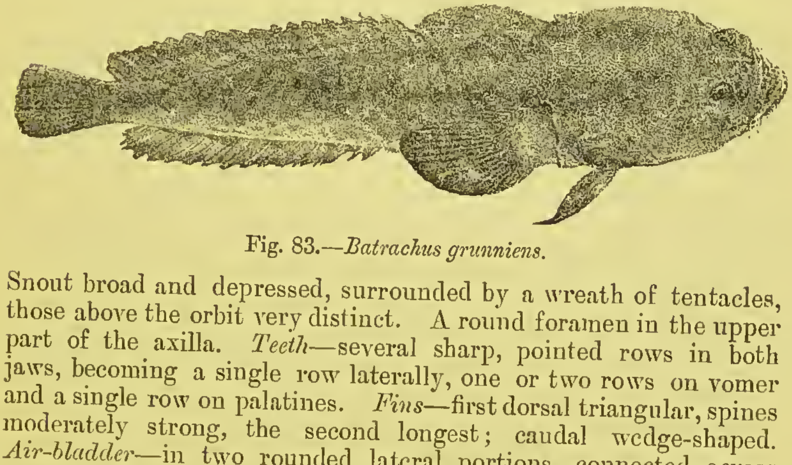

Fig. 83.—*Batrachus grunniens.*

Snout broad and depressed, surrounded by a wreath of tentacles, those above the orbit very distinct. A round foramen in the upper part of the axilla. *Teeth*—several sharp, pointed rows in both jaws, becoming a single row laterally, one or two rows on vomer and a single row on palatines. *Fins*—first dorsal triangular, spines moderately strong, the second longest; caudal wedge-shaped. *Air-bladder*—in two rounded lateral portions, connected across the body of the vertebra. *Colour*—yellowish, marbled darker.

Hab. Seas of India (most numerous along the Malabar coast) to the Malay Archipelago.

1003. (2.) Batrachus gangene.

Batrachoides gangene, *Ham. Buch. Fish. Ganges*, pp. 34, 365, pl. 14, fig. 8; *Day, Fish. India*, p. 270, pl. lx, fig. 1 (see synon.).

D. 3 | 20–22. P. 21. V. 1/2. A. 16–18. C. 15.

Length of head $3\frac{1}{3}$, of caudal $7\frac{1}{2}$ to 8, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 7 to 8 in length of head, 3 diam. from end of snout, and $3\frac{1}{2}$ apart. Head broad, depressed, its greatest width nearly equal to its length. Four backwardly directed spines on the gill-covers, two on the operele, the other

two on the suboperele. Snout broad, depressed, surrounded by tentaeles, whieh are most distinct along the edge of the maudible, some also round the eye, and numerous fine ones over the surfaee of the head. No foramen in axilla. *Teeth*—two or more rows of teeth in the eentre of either jaw, a single row laterally, those in the mandibles the largest and directed a little inwards; two rows of teeth on vomer; a single one on palatines. *Fins*—as in the last species. *Colour*—light reddish brown, marbled darker.

Hamilton Buehanan observed that this fish is an ugly animal, does not exceed a spau in length, and when frightened emits a remarkable ereaking noise.

Hab. Estuaries of the Ganges and other large Indian aud Burmese rivers; attaining at least a foot iu length.

Family XXV. PEDICULATI.

Branehiostegals five or six; pseudobranehiæ absent. Skeleton fibro-osseous. Head aud anterior portion of the body large, the former depressed or eompressed. Gills two and a half or three and a half; gill-opening reduced to a small foramen, situated in or near the axilla. Teeth minute, villiform or eardiform. The spiuous dorsal, when present, composed of a few isolated spines; the carpal bones prolonged, forming a sort of arm for the pectoral fin; ventrals, when present, jugular, with four or five soft rays. Air-bladder present or absent. Pylorie appendages few or absent.

Geographical Distribution. All seas.

The modified dermoneurals, forming the cephalic tentacles of *Antennarius*, are reproduced when iujured (Oweu). These fishes attach themselves to any object by means of their pectoral and ventral fius, and Mr. Whitmee observed that one placed in a basin eontaining about a pint of water produced so strong a eurrent by sucking in water with its expansive jaws and subsequently expelling it with mueh force through the branchial orifice that a rapid rotatory motion was produeed. The gulf-weed (*Sargassum bacciferum*) assists the migratiou of these fishes; during the winter months the prevailing gales bring to the islands of the Bermudas large fields as well as isolated patches of weed, on which many fishes find a home and amoug them *Antennarius*. Here it makes its wonderful nest suspended by means of silk-like fibres, which prove strong enough to support the large buuches of eggs that hang like grape-clusters within their orbicular case (see J. M. Joues, 'Nature,' February 20, 1879, xix. p. 363); and M. Vaillant has shown that "eaeh nest is made of one seaweed, the different twigs being brought together and made fast to each other by the fish by means of a pasty sort of substanee provided by the animal itself" ('Nature,' December 29, 1887, xxxvii, p. 208).

Synopsis of Indian Genera.

Head and body compressed. Teeth on palate. Gills lateral	1. ANTENNARIUS.
Head and body strongly depressed. No teeth on palate. Gills on upper surface of body ..	2. HALIEUTÆA.

1. Genus **ANTENNARIUS** (Comm.), Cuv.

Syn. *Chironectes*, pt., Cuv.

Head large, elevated and compressed. Only one half of the anterior branchial arch provided with lamellæ. Cleft of mouth nearly vertical. Eyes lateral. Gill-openings lateral. Cardiform teeth in the jaws and palate. The spinous dorsal in the form of three isolated spines, the anterior of which, situated upon the snout, is modified into a tentacle; the second dorsal of moderate length; anal short. Body smooth, granulated, or covered with minute spines, and sometimes with cutaneous tentacles. Air-bladder large and simple. Pyloric appendages absent.

Geographical Distribution. Pelagic, chiefly tropical. These fishes, as a result of their mode of progression, have a wide geographical range. Their pediculated pectoral fins allow them to walk or hop over moist ground or slimy rocks in quest of their prey, and even clasp pieces of wood or seaweeds. Although bad swimmers, M. Dussumier observed that they inflate themselves and float on the water like a *Diodon*. The "Anglers," to which this genus belongs, conceal themselves in the mud, displaying only the erectile first ray, situated on the head, and which bears an excrescence on its extremity resembling a worm or piece of meat. By agitating this, smaller fishes are attracted and fall a prey.

The species of this genus, owing to variation in colour, to change in the form of the spines on the body with age, and to the abnormal increase or decrease in the number of rays, are difficult to discriminate one from another.

Synopsis of Indian Species.

Skin rough. Yellow, with brown spots and streaks	1. *A. hispidus*, p. 231.
Skin rough. Greyish brown, with a black ocellus on the side, another at base of middle of dorsal fin. Fins spotted	2. *A. nummifer*, p. 232.
Skin generally smooth, but with fleshy excrescences. Colours various, sides with white spots	3. *A. marmoratus*, p. 233.

1004. (1.) Antennarius hispidus. (Fig. 84.)

Lophius hispidus, *Bl. Schn. Syst. Ich.* p. 142.
Antennarius hispidus, *Day, Fish. India*, p. 271, pl. lx, fig. 2 (see synon.).

Kappa mura moia, Tel.; *Kend*, Maráthi.

B. vi. D. 3 | 12. P. 10. V. 5. A. 7. C. 9.

Mouth subvertical, lower jaw a little compressed, the width of the gape of the mouth exceeding that of the cleft. *Eyes*—high up, from 2 to $2\frac{1}{2}$ diameters from end of snout. *Fins*—first dorsal spine about as long as the second, and ending in a fleshy knob, second about as long as the third, and each with a skinny flap posteriorly, that from the third nearly or quite joining the second dorsal fin, the last three rays of which are branched. Pectoral and ventral rays unbranched. Last six anal rays branched, as are also

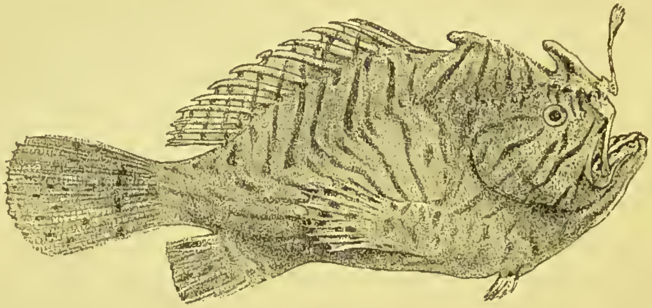

Fig. 84.—*Antennarius hispidus.*

those of the caudal. *Skin*—universally roughened, with spiny points extending over the fins, except some of the rays of the pectoral, ventral, and caudal. *Lateral line*—ceases below middle of second dorsal. *Colour*—yellow, with brown spots and streaks, some radiating from the eye, others descending from the back and many down the sides. Small streaks and blotches or spots on the fins.

Hab. Seas of India to the Malay Archipelago and beyond.

1005. (2.) Antennarius nummifer.

Chironectes nummifer, *Cuv. Mém. Mus.* iii, p. 430, pl. xvii fig. 4.
Antennarius nummifer, *Day, Fish. India*, p. 272, pl. lix, fig. 2 (see synon.).

B. vi. D. 3 | 12. P. 10–13. V. 5. A. 7. C. 9.

Mouth almost vertical, with the lower jaw compressed towards its extremity, the width of the gape equalling the extent of the cleft. *Eyes*—high up, but little more than 1 diameter from end of snout. *Fins*—first dorsal spine not quite so long as the second, and ending in a fringed extremity, second rather above $\frac{1}{2}$ as long as third, which latter has a flap of skin posteriorly, which does not extend so far as to the base of the second dorsal, the last two rays of which are divided at their outer extremities. Pectoral and ventral rays unbranched. Anal commences under middle of second dorsal, has branched rays, its last just reaches the base of the caudal. Caudal rounded, its rays branched; last dorsal rays just reach the base of the caudal fin. *Skin*—universally roughened,

with points extending over fins except some of the rays of the pectoral, ventral, and caudal. *Lateral line*—ceases below the commencement of the second dorsal. *Colour*—greyish brown with a purplish tinge; a black ocellus having a yellow edge behind and above the end of the base of the pectoral fin. Fins yellow, the dorsal with a black yellow-edged ocellus below its seventh and eighth rays, its end with black bands and spots, as have also the pectoral, ventral, caudal, and anal fins. Tongue whitish, with green marks; eyes golden.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond. Grows to at least 6½ inches in length.

1006. (3.) Antennarius marmoratus.

Lophius marmoratus, *Bl. Schn. Syst. Ich.* p. 141.
Antennarius marmoratus, *Day, Fish. India,* p. 272 (see synon.).

B. vi. D. 3 | 12. P. 9–10. V. 5. C. 9. A. 7. Vert. 9/9.

The variations in this species due to age or locality are so considerable that two specimens are very rarely found possessing complete similarity. *Eyes*—about 1 diameter from end of snout. The skin may be smooth, minutely or distinctly granulated, while the length of the third dorsal spine varies from one half to less than one third of the height of the body. The anterior dorsal spine is short and slender, and terminates in a small knob having a minute tentacle attached, sometimes it is very short, or it may be entirely absent; the second and third spines are fringed on their summits. The last two dorsal rays branched, the last if laid backwards extends to or slightly beyond the root of the caudal. Skin usually smooth, or sometimes granular, rarely rough. Head and body with cutaneous tentacles, those at the angle of the mouth and on the abdomen being the largest. Stomach a large sac. *Air-bladder*—large and simple. *Colour*—variable, generally reddish yellow marbled with brown, and brown spots mostly edged with white, radiating from the eye; round white spots on sides and on abdomen. In some the fins are banded. Iris golden, with radiating brown lines.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

2. Genus HALIEUTÆA, Cuv. & Val.

Syn. *Astrocanthus,* Swainson.

Body and head depressed, the latter very large and broad, anteriorly forming the arc of a circle. Eyes antero-lateral. Cleft of mouth horizontal, rather wide, with the upper jaw rather protractile. A transverse bony ridge across snout, beneath which is a retractile tentacle. Gill-opening near the axilla on the upper surface of the body. Gills two and a half; the anterior branchial arch destitute of laminæ. Small teeth on jaws and tongue; palate

edentulous. A short dorsal and anal fin; fin-rays unbranched. Body and head covered with small spines. Air-bladder and pyloric appendages absent.

1007. (1.) **Halieutæa stellata.** (Fig. 85.)

Lophius stellatus, *Wahl. Skr. Nat. Kjöb.* iv, p. 214, t. iii, figs. 3, 4; *Bl. Schn. Syst. Ich.* p. 142.

Halieutæa stellata, *Day, Fish. India*, p. 273, pl. liv, fig. 1 (see synon.).

B. vi. D. 4. P. 13. V. 1/5. A. 4. C. 9. Vert. 7/10.

Eyes—lateral, with the interorbital space rather concave. The retractile tentacle above the mouth has a trefoil extremity. Gill-openings above the axilla in about the middle of the total length.

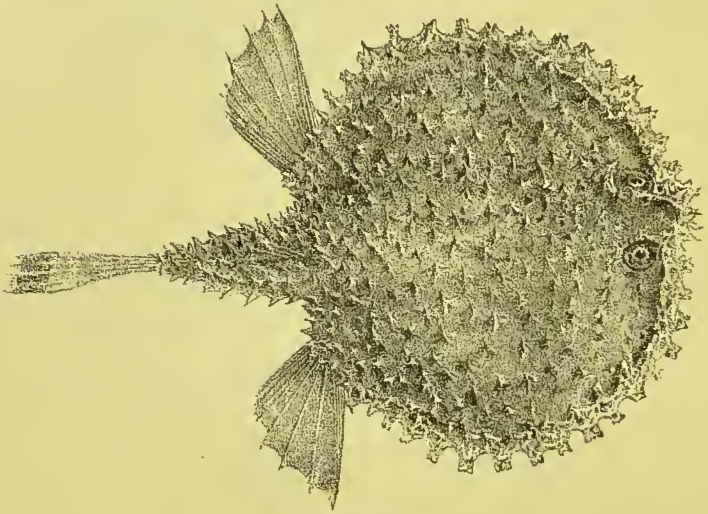

Fig. 85.—*Halieutæa stellata.*

Fins—dorsal fin situated in the third fifth of the total length, and slightly behind the pectorals. Body covered with rather distantly placed spines, each of which as a rule has four or more roots; the lateral spines are the largest, and in the anterior half of the body have three or even four points at their outer edges. *Colour*—pinkish.

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least 8 inches in length.

Family XXVI. COTTIDÆ.

Platicephalinæ (subfam.), Swainson.

Body oblong or subcylindrical. Eyes lateral or partly directed upwards and outwards. Cleft of mouth lateral. Some of the bones of the head armed. Infraorbital bones articulate with the preopercle. Teeth villiform, no canines. Two separate dorsal fins or one fin in two distinct portions, the spinous less developed than the soft or than the anal; ventrals thoracic, sometimes scarcely developed. Air-bladder generally absent. Pyloric appendages few, or in moderate numbers.

Geographical Distribution. Almost all seas, a few species living in fresh water.

Synopsis of Indian Genera.

Head broad, depressed. No pectoral appendages. 1. Platycephalus.
Head parallelopiped. Three pectoral appendages. 2. Trigla.
Head parallelopiped. Two pectoral appendages; body covered with bony scale-like plates .... 3. Peristethus.

1. Genus **PLATYCEPHALUS**, Bl. Schn.

Ulu parti, Tam.; *Chorbombil,* Maráthi. *Flat heads* or *Crocodile Fishes.*

Branchiostegals six or seven; pseudobranchiæ. Head broad, depressed, and armed with spines. Lower jaw the longer. Eyes lateral or superior. Villiform teeth in the jaws, vomer, and palatines, with larger ones sometimes intermixed. Two dorsal fins, the first having a small isolated spine anterior to it; the soft portion similar to the anal; ventrals thoracic; no pectoral appendage. Scales present, ctenoid, small or rather so. Lateral line complete, in some species armed with spines. Air-bladder absent. Pyloric appendages in moderate numbers.

These fishes are termed "Crocodile fishes" in Malabar, and wounds from their spines are dreaded because of the violent irritation they occasion. Their eyes are peculiar; the iris possesses two semicircular flaps, one above, the other below, the upper being usually the larger; these flaps can be brought close together, probably under the stimulus of light. The comparative width of the head to its length differs in individuals, also with age, becoming broader in the adult. I have captured specimens full of well-developed ova as early as February. These fishes are eaten by the lower classes of natives.

Geographical Distribution. Coasts of Indo-Pacific Ocean.

Synopsis of Indian Species.

A. Lateral line with spines throughout .. 1. *P. scaber*, p. 236.
B. Anterior third of l. l. spiny, remainder smooth.
  L. l. 53–55. Width of head $\frac{4}{5}$ of length. 2. *P. tuberculatus*, p. 237.
  L. l. 75. Width of head $\frac{1}{2}$ of length .. 3. *P. macracanthus*, p. 238.
C. Lateral line without spines.
  D. 1 | 7 | 13. (First dorsal with 7 spines.) Head as broad as long .... 4. *P. insidiator*, p. 238.
  D. 1 | 8 | 12. Eyes $\frac{1}{2}$ to $\frac{2}{3}$ diameter apart. 5. *P. punctatus*, p. 239.
  D. 1 | 8 | 12–13. Eyes $\frac{1}{4}$ diam. apart; crests on head serrated, not spiny .... 6. *P. serratus*, p. 240.
  D. 1 | 8 | 12–13. Eyes $\frac{1}{4}$ diam. apart; crests on head spiny .... 7. *P. carbunculus*, p. 240.

1008. (1.) **Platycephalus scaber.** (Fig. 86.)

Cottus scaber, *Linn. Syst. Nat.* i, p. 451.
Platycephalus scaber, *Day, Fish. India*, p. 275, pl. lx, fig. 3 (see synon.).

Irwa, Tel.; *Vet-ool-pa-thy*, Tam.

B. vi. D. 1 | 7–8 | 12. P. 21. A. 12. C. 15. L. r. 105.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, of caudal fin 8, height of body 8 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $5\frac{1}{4}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Interorbital space concave. Greatest width of head $\frac{4}{7}$ of its length. A sharp spine at anterior upper edge of orbit; supraorbital margin serrated, and from it a spiny ridge goes to the occiput; a similar ridge from hind edge of eye to shoulder; a third from preorbital to angle of preopercle, where there are two spines, the upper as long as $\frac{1}{2}$ or $\frac{2}{3}$ distance to orbit; a third short spine at anterior base of larger one.

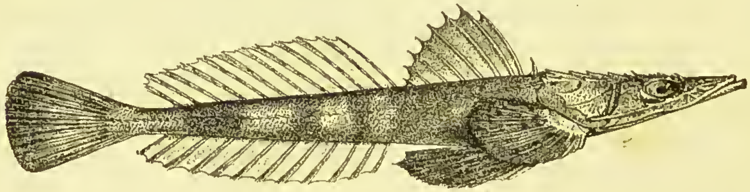

Fig. 86.—*Platycephalus scaber.*

In a young specimen 5 inches long the preopercular spine if laid forwards would reach as far as the orbit. No spines at nostrils, but in some specimens, on the median ridge, opposite the nostrils, are two small ones. Two opercular spines. *Teeth*—small in jaws, in two oval parallel patches, about as long as the eye, on the vomer; in an elongate band on either palatine. *Fins*—second dorsal spine equals $\frac{3}{8}$ to $\frac{1}{3}$ length of head, and is not quite so high as the two next, second dorsal about same height as first. Ventral nearly reaches anal, which commences slightly behind vertical from first dorsal ray. Caudal cut nearly square. *Scales*—4 or 5 rows between the lateral line and base of first dorsal fin, each of those on

the cheeks is furnished with a small spine, which in old individuals is occasionally divided into several. *Lateral line*—with about 55 rather strong spines directed backwards, and extending along its entire length, one on every alternate scale. *Colour*—brownish, becoming dull white beneath; more or less distinct vertical bands pass from the back to the sides. First dorsal clouded with black, second dorsal spotted. Pectoral and ventral usually dark externally. Caudal greyish in its last half. The young are more distinctly banded than the adults, and the first dorsal, pectorals, and ventrals are nearly black.

Hab. Seas of India to the Malay Archipelago and beyond.

1009. (2.) Platycephalus tuberculatus.

Platycephalus tuberculatus, *Cuv. & Val. H. N. Poiss.* iv, p. 258; *Day, Fish. India*, p. 275, pl. lx, fig. 5 (see synon.).

B. vi. D. 1 | 7–8 | 11–12. P. 21. A. 11–12. C. 15. L. l. 53–55.

Length of head 3 to $3\frac{1}{4}$, of caudal fin 7, height of body 6 in the total length. *Eyes*—directed upwards and somewhat outwards; diameter $3\frac{2}{3}$ to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. Interorbital space concave. Width of head between preopercular spines $\frac{4}{5}$ of its length. Supraorbital margin serrated, with two sharp spines anteriorly; from it a serrated ridge runs back to occiput, a second from behind eye to upper opercular spine; a third ridge from preorbital to angle of preopercle. A few spines in median line midway between eye and snout; a spiny ridge passes forwards from the spines on either side above the limbs of the premaxillaries. A serrated bony ridge across opercle to a strong spine at middle of its hind edge. Angle of preopercle with a strong spine which equals half distance between its base and orbit; this spine has one above at end of serrated ridge, another a little longer below, situated on lower margin of preopercle, which bears from 2 to 4 more, decreasing in size anteriorly and all pointing backwards. Several spines at the shoulder, and a strong one above the axilla. *Teeth*—villiform in jaws, in two oval parallel patches on vomer, and in an elongate band on palatines. *Fins*—second dorsal spine $\frac{4}{9}$ length of head, and not quite so high as third, soft dorsal as high as spinous. Ventral nearly reaches anal, which arises below the second dorsal; caudal slightly rounded. *Scales*—4 or 5 rows between lateral line and base of first dorsal fin; most of those on the cheeks have a rudimentary spine. *Lateral line*—with from 15 to 20 spines in the first third of its course. *Colour*—brown, becoming lighter beneath, vertical bands pass from back to sides. First dorsal blackish brown; second dorsal spotted. Pectoral with brown spots in its upper two thirds, and a black margin with a white edge along its lower border; outer half of ventrals grey.

Hab. Seas of India.

1010. (3.) Platycephalus macracanthus.

Platycephalus macracanthus, *Bleeker, Versl. en Meded. Ak. Wet. Amsterd.* 1867, p. 7, c. fig.; *Day, Fish. India*, p. 276, pl. lix, fig. 3.

B. vii. D. 1 | 8 | 12. P. 23. A. 12. C. 13. L. r. 75/65. L. tr. 4/15.

Length of head $3\frac{1}{3}$, of caudal $7\frac{1}{2}$, height of body $7\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{3}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and about $\frac{1}{2}$ apart. Interorbital space concave. Width of head between preopercular scales equal to about $\frac{1}{2}$ its length. Supraorbital margin with six strong denticulations, and the ridge from it to occiput with about five more; ridge from eye to shoulder with about five spines; that from preorbital to preopercular spine with six (besides being serrated). A small spine on inner side of front nostril, which is furnished with a cirrus. Spine at angle of preopercle reaching to the base of the pectoral, a short spine below succeeded by another still more minute. *Teeth*—villiform, in two parallel patches on vomer, and in a narrow band along either palatine. *Fins*—second dorsal spine $\frac{4}{9}$ length of head, and nearly as high as commencement of second dorsal fin. Pectoral $\frac{4}{9}$ length of head, ventral slightly longer. Anal commences below second ray of dorsal; caudal cut square. *Scales*—those on the head not spiny. *Lateral line*—with about 15 small spines in the first portion of its course. *Colour*—brownish above, becoming dull white beneath, first dorsal and end of caudal darkish, second dorsal with brown spots on the rays.

Hab. Madras; Amboina.

1011. (4.) Platycephalus insidiator.

Cottus insidiator, *Forsk. Descr. Anim.* p. 25.

Platycephalus insidiator, *Day, Fish. India*, p. 276 (see synon.).

Irwa, Tel.; *Ool-pa-thy*, Tam.; *Nga-paying-ki*, Mugh; *A-ra-wud-dah* or *Chou-ur-dah*, And.; *Nga-prang-khyt* and *Kuéy meedong*, Arracan; *Moor bullia*, Chittagong.

D. 1 | 7 | 13. A. 13. L. r. 120–125/100–120. L. tr. 12/24. C. p. 14.

Length of head $3\frac{3}{5}$, of caudal 7, height of body 7 in the total length. *Eyes*—superior, diameter $6\frac{3}{4}$ to 7 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Head strongly depressed, its upper surface triangular, the base between the preopercular spines $\frac{3}{4}$ of the length. Interorbital space flat or slightly concave, two ridges extending back from orbit, the inner dividing over the occiput, whilst the outer or temporal terminates at the shoulder in two blade-like spines. One spine at anterior lower angle of orbit, none at nostrils, which are patent but not tubular. Preorbital with three raised grooves starting in a stellate form from a common centre. Preopercle with most of its surface forming a portion of the flattened upper plane of the head, and having two very strong spines at its angle, the inferior of which is the longer and some-

times equals the diameter of the eye. Operclo with two spines. *Fins*—first dorsal spines weak, the first slightly the longest, interspinous membrane very slightly emarginate. A small, stout, single spine before first dorsal, and sometimes another fine one between first and second dorsal, the rays of which anteriorly are as high as the spines of the first dorsal. Caudal obtuse or even rounded. *Colour*—brownish above, becoming dirty white beneath; fins spotted. Caudal yellow, with a deep black band, having a white border, obliquely crossing its upper lobe, a second along its lower lobe.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond; attaining at least a foot and a half in length.

1012. (5.) Platycephalus punctatus.

Platycephalus punctatus, *Cuv. & Val. H. N. Poiss.* iv, p. 243; *Day, Fish. India*, p. 277, pl. lx, fig. 3 (see synon.).

B. vii. D. 1 | 8 | 12. P. 21. A. 11–12. L. l. 110/100. L. tr. 8/25.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, of caudal 8 to 9, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter from 5 to $5\frac{1}{2}$ in length of head, $1\frac{2}{3}$ to 2 diam. from end of snout, and $\frac{1}{2}$ to $\frac{2}{3}$ apart. Interorbital space slightly concave. Width of head between preopercular spines equals half its length. Supraorbital margin with four or five spines, the ridge from it towards occiput with two more small ones; ridge from eye to shoulder-spine with three or four spines; ridge from preorbital to preopercular spine with two or three spines. A small spine on the inner side of each front nostril. Spine at angle of preopercle strong, its length about $\frac{1}{7}$ that of head, a small one above its base, and a large one below directed slightly downwards as well as backwards. Posterior nostril rather tubular, anterior also tubular and with a valve which sometimes terminates in a short filament. A small spine above the axilla. *Teeth*—villiform in jaws, in two parallel bands on vomer, and in a long narrow patch along palatines. *Fins*—second spine of first dorsal not so high as third, spines from that to sixth subequal in length, and $\frac{1}{2}$ length of head; second dorsal anteriorly $\frac{3}{4}$ height of spinous. Pectoral $\frac{1}{2}$ and ventrals $\frac{2}{3}$ length of head. Anal commences before second or third ray of dorsal. Caudal cut square. *Scales*—about 10 rows between lateral line and base of spinous dorsal; those on head and cheeks have no trace of any spine. *Lateral line*—smooth in its entire extent, tubes with one or two simple branches. *Colour*—brown, becoming lighter beneath; four or five wide and dark bands pass from the back to the middle of the sides; numerous black spots over head and body. First dorsal stained nearly black, second dorsal and anal yellowish, the first with brown points. Pectoral covered with dark markings so as to appear almost black. Ventral dark in its last two thirds. Caudal dark.

Hab. Seas of India to the Malay Archipelago; attaining at least 15 inches in length.

1013. (6.) Platycephalus serratus.

Platycephalus serratus, *Cuv. & Val. H. N. Poiss.* iv, p. 259; *Day, Fish. India,* p. 277 (see synon.).

B. vii. D. 1 | 8 | 11–12. P. 19. V. 1/5. A. 11. C. 13.

Length of head 4 in the total length. Interorbital space $\frac{1}{4}$ of transverse diameter of eye. The crests on the various bones of the head and suborbital ring are serrated but destitute of spines. The supraorbital ridge is elevated; that across the opercle is smooth. The ridge from eye to angle of preoperele is elevated and finely denticulated, above it is another less pronounced and smooth. Upper spine at the angle of the preopercle the largest, it is succeeded by a shorter one, and on the border of the interopercle are two more small ones; there does not appear to be any spine directed anteriorly, or if there is it is but a little one. *Teeth*—fine. *Scales*—with rough borders. *Lateral line*—smooth. *Colour*—reddish brown, with six or eight irregular brown bands descending from the back to the white abdomen. Fins grey, with black points. On the top of the dorsal a black blotch. Ventrals bluish above and whitish below.

Hab. Trincomalee, growing to 7 inches in length.

1014. (7.) Platycephalus carbunculus.

Platycephalus carbunculus, *Cuv. & Val. H. N. Poiss.* ix, p. 461; *Day, Fish. India,* p. 278 (see synon.).

B. vii. D. 1 | 8 | 11–12. A. 11–12. L. l. 75–80/65–70. L. tr. 6/26.

Length of head 3 to $3\frac{1}{2}$, of caudal 5 to 6, height of body $6\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Supraorbital edge with one or two spines anteriorly and a strongly serrated edge; the line from the orbit to the occiput has six, and that to the shoulder-spine five spines. From the preorbital a raised line armed with 10 or 12 spines runs to the two preopercular spines, the upper (which has a small one at its base) longer than the lower. Two, or even three, turbinal spines; no nasal tentacle. Two well-marked opercular spines, and another in the axilla. *Fins*—ventral reaches origin of anal; caudal cut square. *Scales*—ctenoid, present on the head, but without spines or raised points. *Lateral line*—smooth. *Colour*—brownish, with numerous brown spots; three vertical bands on body, one broad one through anterior half of first dorsal to abdomen, a second through middle of second dorsal, and a third over free portion of tail; opercle dark; posterior half of first dorsal black;

second dorsal spotted; pectoral with several lines of spots and a dark mark near its base; caudal dark, with one or two ill-defined vertical bands.

Hab. Western coast of India, Madras, and the Malay Archipelago. Cantor observes that this fish occurs, although not numerously, at all seasons at Pinang, and is eaten by the natives; his largest specimens were $6\frac{1}{2}$ inches in length.

2. Genus TRIGLA, Artedi.

Syn. *Hoplonotus*, Guichenot.

Branchiostegals seven; pseudobranchiæ present. Head parallelopiped, with its superior and lateral surfaces bony, infraorbital bone enlarged, covering the cheeks. Villiform teeth in both jaws, and usually on the vomer, but none on the palatines. Two dorsal fins, the first being of less extent than the second; three free filaments at the base of the pectoral fin. Air-bladder well developed, generally provided with lateral muscles, and sometimes partially divided internally by partitions. Pyloric appendages few or in moderate numbers.

Geographical Distribution. Tropical and temperate seas. This genus contains the gurnards.

1015. (1.) Trigla hemisticta.

Trigla hemisticta, *Temm. & Schl. Faun. Japon., Poiss.* p. 36, pl. xiv, figs. 3, 4, pl. xiv, B; *Day, Fish. India, Suppl.* p. 791 (see synon.).

D. 7/11–12. P. 11+iii. V. 1/5. A. 11–12. C. 16.

Length of head about 3, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—$1\frac{1}{2}$ diameters from end of snout and $1\frac{1}{4}$ apart. Profile from upper edge of orbit to the snout scarcely concave. Preorbital produced anteriorly into a flattened spine; two spines on the preopercle, the upper the larger. Opercle ending behind in a strong spine as long as the orbit; shoulder-bone with two spines. *Teeth*—villiform. *Fins*—dorsal spines strong, third and fourth longest; a bony plate along the base of the dorsal fin, wider in small than in large examples. Pectoral reaches to above third anal ray. *Scales*—small. *Colour*—upper part of body rosy, with numerous small rounded or oblong black spots; lower half of body white. First dorsal with a large black oblong blotch and a row of small round black dots along the middle of the second dorsal; inter-radial membrane of pectoral bluish black.

Hab. An example 9 inches long has been obtained from Muscat; the species has likewise been brought from Japan.

3. Genus PERISTETHUS, Kaup.

Branchiostegals seven; pseudobranchiæ present. Head paral-

lelopiped in shape, the sides and upper surface cuirassed with bone; the preorbital prolonged anteriorly into a flat projecting process. One or more barbels on the lower jaw. Teeth absent. One or two dorsal fins, the posterior of which is most developed. Two free pectoral appendages. Body covered with bony, scale-like plates. Pyloric appendages few or in moderate numbers. Air-bladder present.

Geographical Distribution. South coast of Britain, Mediterranean, Atlantic and Indian Oceans to China, and Sandwich Islands.

1016. (1.) Peristethus halei.

Peristethus halei, *Day, Fish. India, Suppl.* 1888, p. 791 (see synon.).

D. 7/15. V. 1/5. A. 15. L. l. 34.

"Preorbital processes short, their length being contained $3\frac{1}{2}$ times between their extremity and the anterior margin of the orbit. A pair of spines on the occiput, on either side of which is a low ridge terminated by a small spine. Anterior vertical plates longer than broad. The opercular ridge forms a strong spine. Lower jaw with barbels. *Colour*—uniform red." (*Haly.*)

Hab. A single specimen taken at Galle in deep water in April, 1883.

Family XXVII. CATAPHRACTI.

Infraorbital bones articulate with the preopercle. Head and body more or less angular, cuirassed with plates, or keeled scales entirely cover the body. The opercular pieces may or may not be anchylosed. Teeth present or absent in the jaws, in one species present on the vomer. One or two dorsal fins; ventrals thoracic, with five or less rays.

Geographical Distribution. Tropical Atlantic, Mediterranean, and Indo-Pacific.

Synopsis of Indian Genera.

A long spine at angle of preopercle. Dorsal fin with detached rays anteriorly; pectorals very elongate, with the anterior portion detached and shorter than the rest of the fin	1. DACTYLOPTERUS.
No spine at angle of preopercle. Pectorals rather elongate and with unbranched rays	2. PEGASUS.

1. Genus DACTYLOPTERUS (Lacép.).

Branchiostegals six. Head with its surfaces more or less flattened, bony above and on the sides. The angle of the preopercle and the shoulder-bone each produced into the form of a long spine. Granular teeth in the jaws only. Two dorsal fins of nearly equal length; pectorals much elongate, the anterior portion detached from and shorter than the upper. Scales on body keeled and of a moderate size. Lateral line absent. Air-bladder in two lateral portions, each furnished with a large muscle.

Geographical Distribution. Tropical Atlantic and Pacific, Mediterranean, and Indian Ocean.

1017. (1.) Dactylopterus orientalis. (Fig. 87.)

Dactylopterus orientalis, *Cuv. & Val. H. N. Poiss.* iv, p. 134, pl. 76; *Day, Fish. India,* p. 279, pl. lx, fig. 6; *Suppl.* p. 792 (see synon.).

Shashana, Arabic; *Ana toumbi,* Tam.

D. 1 | 1 | 5–6 | 8. P. 30. V. 6. A. 6. C. 9. Vert. 9/13. C. p. 18–19.

Length of head (including preopercular spine) 3 to $3\frac{1}{2}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—nearly one diameter from end of snout and also apart. Interorbital space concave. Spine at angle of preopercle more than half length of rest of head. Bony covering of head produced backwards to below second or third dorsal spine. A shoulder-spine. *Fins*—an elongated filament arises over occiput and is $\frac{1}{2}$ longer than head; a second, also detached, midway between it and first dorsal spine, than which it is half

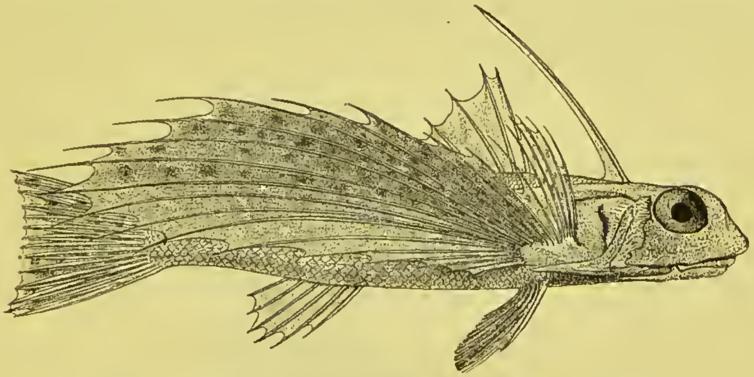

Fig. 87.—*Dactylopterus orientalis.*

shorter. Fin-rays unbranched except last few of dorsal and sometimes of anal, those of the caudal are bifid. Pectoral reaching to end of caudal, its first few rays are short, and rather detached from the remainder of the fin, its middle rays are longest. *Scales*—with a ridge along each; a large scale forms an oblique

keel along either side of base of caudal fin. *Colour*—pinkish, with a tinge of blue along the abdomen; dorsal and caudal rays spotted; pectoral grey along the middle, and the whole of the fin spotted, in the young it appears to have a large round black spot edged with white.

Hab. Seas of India to the Malay Archipelago and beyond. The figure is taken from a specimen in the British Museum.

2. Genus **PEGASUS**, Linn.

Branchiostegal one; pseudobranchiæ absent. Gills four; gill-opening narrow, in front of the pectoral fin. Body broad and depressed, covered with bony plates, which are anchylosed on the trunk and movable on the tail. Gill-cover formed of one bony plate, and a small interopercle concealed by it. No teeth. One short dorsal and anal fin opposite to one another; pectorals horizontal and long, composed of simple rays, some of which may be spinous; ventral with one or two rays, the outer elongate. Air-bladder absent.

Geographical Distribution. Shores of Indian Ocean.

1018. (1.) **Pegasus draconis.** (Fig. 88.)

Pegasus draconis, *Linn. Syst. Nat.* i, p. 418; *Day, Fish. India*, p. 280, pl. lxi, fig. 1 (see synon.).

D. 5. P. 11. V. 2. A. 5. C. 8.

Body broad and depressed. *Eyes*—$2\frac{1}{2}$ diameters from end of snout and 2 apart. Interorbital space transversely concave, two deep grooves on the neck. Under surface nearly flat, the expanded

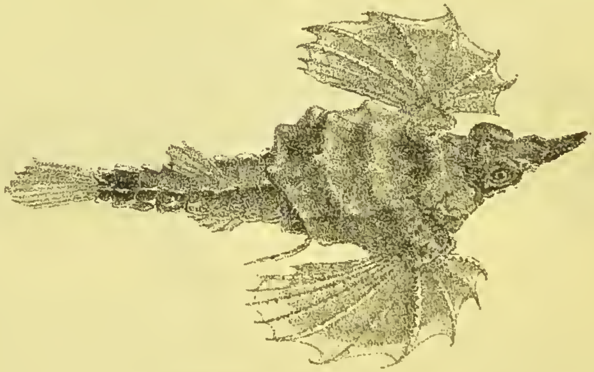

Fig. 88.—*Pegasus draconis.*

portion with two median and two lateral longitudinal ridges and three cross ridges; at the meeting-points of the various ridges are

obtuse points. Caudal portion composed of eight rings, most of the anterior five of which have a lateral spiny elevation. Lateral edges of snout denticulated; a serrated ridge runs along the upper edge of orbit and is continued along the snout to its end. *Fins*—anterior pectoral rays the shortest. Vent midway between posterior edge of orbit and root of caudal fin. *Colour*—body with brown reticulations, snout and last caudal ring black. Pectoral grey, its rays spotted, with a white outer edge and sometimes a white band.

Hab. Seas of India to the Malay Archipelago and beyond.

Family XXVIII. GOBIIDÆ.

Pseudobranchiæ present, sometimes rudimentary. Body generally elongate. The infraorbital ring of bones does not articulate with the preopercle. A single rayed dorsal fin, sometimes divided into two portions; the spines are flexible, and the spiny part of the fin has fewer rays than the remainder; anal similar to the soft dorsal; ventrals sometimes united so as to form a disk, or arising close together. Air-bladder generally absent. Pyloric appendages, if present, few.

Geographical Distribution. Shores of tropical and temperate regions, some inhabiting fresh water.

Synopsis of Indian Genera.

First group. Gobiina.

Ventrals forming a disk and united throughout or only in their basal halves; two dorsal fins.

A. Eyes not remarkably prominent, base of pectoral not peculiarly developed.
- *a.* Teeth in more than one row in one or both jaws.
  - *a'.* Ventrals not adherent to abdomen throughout.
    - Body elongate, generally scaly .... 1. Gobius.
    - Body compressed, scaleless .... 2. Gobiodon.
  - *b'.* Vetrals adherent to abdomen throughout .... 3. Sicydium.
- *b.* Teeth in a single row in both jaws.
  - A pair of posterior canines above mandibular symphysis .... 4. Apocryptes.
  - No canines above mandibular symphysis .. 5. Apocryptichthys.

B. Eyes remarkably prominent and close together; base of pectoral largely developed, very muscular.
- Teeth erect in both jaws .... 6. Periophthalmus.
- Teeth in lower jaw horizontal.............. 7. Boleophthalmus.

Second group. ELEOTRINA.

Ventrals not joined. Two dorsals.

Vomerine teeth present .... 8. BOSTRICHTHYS.
No teeth on vomer or palate .... 9. ELEOTRIS.

Third group. AMBLYOPINA.

All the vertical fins more or less united.

No cavity above the opercle. Scales rudimentary or wanting .... 10. GOBIOIDES.
A blind cavity above opercle. Scales small but distinct .... 11. TRYPAUCHEN.

First group. GOBIINA.

1. Genus GOBIUS, Artedi.

Branchiostegals generally five; pseudobranchiæ. Gill-openings of moderate width. Body low and elongate. Opercles unarmed. Simple teeth in one or more rows in the upper, and two or more in the lower jaw; the outer row in each often enlarged; canines sometimes present. Anterior portion of dorsal fin with from five to six flexible spines; ventrals united, forming a disk, which is only attached by its base, each has one spine and four or five rays. Caudal rounded or pointed. Scales present or absent. Lateral line absent. Air-bladder, when present, generally small. Pyloric appendages usually absent.

The fishes comprised in this genus have the form of the body variously modified, some being much deeper than others. They are either wholly scaled, or the head may be scaleless, and even the body partially or entirely devoid of scales. Very often the scales on the posterior portion of the body are longer than those near the head and on it. Barbels or warts on the head or a crest on the occiput may be present or absent.

The dentition is subject to considerable modification. Some specimens possess a recurved canine on the outer side of the enlarged lateral row in the lower jaw; this is more commonly found in marine than in freshwater species. Variations may, however, occur in specimens of the same species.

These fishes are found in numbers along the shores and estuaries of India, but on account of their rapid decomposition after death, full collections have yet to be made.

Geographical Distribution. Fresh, brackish, and salt waters of tropical and temperate regions.

Synopsis of Indian Species.

A. Lateral, recurved canines present in the lower jaw.
   D. 6 | 1/18–19. Scales minute, three or four vertical bands on body .. 1. *G. gymnocephalus*, p. 249.

L. l. 65, L. tr.* 16. Two longitudinal bands, and some cross bars from the back	2. *G. bynoensis*, p. 249.
D. 6 | 11, A. 10. Scales minute. Six vertical bands	3. *G. sexfasciatus*, p. 250.
D. 6 | 1/10, A. 10, L. l. 44, L. tr. 14. Scales very small to below the commencement of second dorsal fin. Olive, with a dark median band.	4. *G. brevirostris*, p. 250.
L. l. 42, L. tr. 14. Olivaceous, with black spots	5. *G. griseus*, p. 251.
L. l. 28–30, L. tr. 8. Purplish black; a yellow-edged ocellus at upper portion of base of caudal fin	6. *G. polynema*, p. 252.
L. l. 33. Vertical fins with dark streaks	7. *G. macrostoma*, p. 252.
L. l. 34–48, L. tr. 9. Olive, with some blotches along the sides, some scales with brilliant green centres	8. *G. viridipunctatus*, p. 253.
L. l. 33, L. tr. 8. Olive with small green spots, blotches along the sides; a yellow ocellus at top of last half of caudal fin	9. *G. ocellatus*, p. 253.
L. l. 28, L. tr. 10. Grey with black fins, and blue spots on the body.	10. *G. masoni*, p. 254.
L. l. 28–30, L. tr. 8. Short barbels. Olive, many scales with blue spots, a blue mark on shoulder.	11. *G. cyanomos*, p. 254.
L. l. 26–32, L. tr. 12–13. No scales before the first dorsal. Olivaceous with black blotches and spots.	12. *G. criniger*, p. 255.
L. l. 30, L. tr. 8. Five longitudinal rows of interrupted bands	13. *G. thurstoni*, p. 255.
L. l. 28–29, L. tr. 8–9. Olive with rusty spots, fin-rays yellow, spotted and barred with purplish red.	14. *G. puntang*, p. 256.
L. l. 32, L. tr. 11. With cloudy dark markings, upper half of first dorsal dusky, a large bluish spot from first to fourth spine	15. *G. bleekeri*, p. 257.
L. l. 27, L. tr. 6. A blue spot on opercle, body with angular bands.	16. *G. zonalternans*, p. 257.
L. l. 28–30, L. tr. 7–8. Some large blotches along the sides, a black ocellus with a white edging in hind portion of first dorsal fin, dorsal fins white-spotted	17. *G. biocellatus*, p. 258.
L. l. 28–29, L. tr. 7. Irregular vertical black bands; vertical fins spotted	18. *G. madraspatensis*, p. 258.
L. l. 28, L. tr. 7. Ochreous, upper	

* L. tr. in the Gobies indicates the number of rows of scales between the origin of the second dorsal and that of the anal fin.

two thirds of body blotched and with dark marks; upper portion of first dorsal yellow, some of the fins barred .... 19. *G. neilli*, p. 259.

L. l. 24, L. tr. 7. Light brown, scales of body with dark marks; vertical fins spotted .... 20. *G. melanosticius*, p. 259.

B. No lateral recurved canines in the lower jaw.

D. 6 | 1/12, A. 1/13, L. l. 50. Greenish with clouded spots on sides .... 21. *G. microlepis*, p. 260.

D. 6 | 14, A. 14, L. l. 50–60, L. tr. 11–12. A crest. A light ocellus at base of pectoral. body spotted and blotched; caudal spotted in its upper half ...... 22. *G. cristatus*, p. 260.

D. 6 | 1/12, A. 1/13, L. l. 60, L. tr. 10. An orbital tentacle; tail acutely pointed. Dull green with reddish spots; vertical fins spotted .... 23. *G. tentacularis*, p. 261.

D. 6 | 1–10/11, A. 1/11, L. l. 25–28, L. tr. 6–7. Tail acutely pointed. Some blotches along the body, a brown band from the eye over the cheeks; dorsal fins longitudinally barred .... 24. *G. acutipinnis*, p. 261.

D. 6 | 1/10, A. 10, L. l. 56–60, L. tr. 14. Yellowish, with some blotches along the sides; fins barred in spots .... 25. *G. striatus*, p. 262.

D. 6 | 1/10, A. 1/10, L. l. 55, L. tr. 14. Light brown, with vermiculated markings .... 26. *G. personatus*, p. 263.

D. 6 | 1/10, A. 1/10, L. l. 50, L. tr. 9. First dorsal with a black crescentic mark........................ 27. *G. malabaricus*, p. 263.

D. 6 | 1/10, A. 10, L. l. 46, L. tr. 15. Head wide. Olive, fins dark grey, a black mark at base of pectoral .... 28. *G. planifrons*, p. 264.

D. 6 | 1/10, A. 1/9, L. l. 36, L. tr. 9. Blotched and banded .... 29. *G. elegans*, p. 264.

D. 6 | 1/10, A. 1/8–9, L. l. 26–28, L. tr. 7. Many oblong brown spots and yellow dots; fins dotted with black .... 30. *G. ornatus*, p. 265.

D. 6 | 1/10, A. 11. Dark spots clustered into cloud-like blotches; vertical fins spotted .... 31. *G. gutum*, p. 265.

D. 6 | 1/9, A. 1/8, L. l. 35–40, L. tr. 11–12. Brownish, irregularly marbled, head and body spotted, some of the spots white .... 32. *G. albopunctatus*, p. 265.

D. 6. | 1/8–9, A. 1/8–9, L. l. 30–34, L. tr. 8–9. Brown, with blotches along the sides; dorsal and caudal barred in spots .... 33. *G. giuris*, p. 266.

D. 6 | 1/9, A. 8, L. l. 28, L. tr. 9. Chestnut, with red bands on the head and below the first dorsal fin .... 34. *G. semidoliatus*, p. 266.
D. 6 | 1/8, A. 9, L. l. 38, L. tr. 10. Maxilla reaches to below hind edge of eye. Brown, spotted .. 35. *G. magniloquus*, p. 267.
D. 6 | 1/8, A. 9, L. l. 38, L. tr. 10. Maxilla reaches to below first third of eye. Dark brown angular bands on the body .... 36. *G. planiceps*, p. 267.
D. 6 | 1/8, A. 1/8, L. l. 28–30, L. tr. 8. Greenish, with large black spots. 37. *G. sadanundio*, p. 268.
L. l. 22, L. tr. 6. A dark band from eye to snout. Ventrals white .. 38. *G. littoreus*, p. 269.
D. 6 | 1/8, A. 10, L. l. 22–25, L. tr. 9. Black .... 39. *G. melanosoma*, p. 269.
D. 5 | 1/9, A. 9, L. l. 30, L. tr. 10. Six black belts round the head and body .... 40. *G. nunus*, p. 269.

1019. (1.) Gobius gymnocephalus.

Gobius gymnocephalus, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 473; *Day, Fish. India, Suppl.* 1888, p. 792 (see synon.).
Karum natsooli, Tam.

D. 6 | 1/18–19. P. 17. V. 1/5. A. 1/19. C. 13.

Length of head 6, of caudal fin $4\frac{1}{4}$, height of body 8 to 9 times in the total length. *Eyes*—high up, diameter $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout and close together. Head higher than broad; snout obtuse; cleft of mouth oblique, the maxilla reaching to below hind edge of eye. *Teeth*—canines in both jaws. *Fins*—dorsal spines nearly as high as body; caudal lanceolate. *Scales*—minute. *Colour*—greenish stone-colour, becoming lighter beneath; three or four vertical bands on the body and another on the nape, with indistinct narrow intermediate ones. Dorsal fins darkish, unspotted; caudal also dark and reddish externally, said to have several blue and red streaks. Anal with a narrow and nearly median band along its extent, which is red externally and blue inferiorly.

Hab. Madras to the Malay Archipelago. Jerdon's figure is 6·4 inches in length.

1020. (2.) Gobius bynoensis.

Gobius bynoensis, *Richardson, Zool. Erebus and Terror, Ich.* p. 1, pl. 1, figs. 1, 2; *Day, Fish. India*, p. 284, pl. lxi, fig. 3 (see synon.).

D. 6 | 1/16. P. 19. V. 1/5. A. 1/15–16. L. l. 65. L. tr.* 16.

* Between origin of second dorsal and that of anal, see note, p. 247.

Length of head $4\frac{1}{2}$ to 5, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Head rather higher than broad; snout obtuse; cleft of mouth a little oblique, the maxilla reaches to below anterior edge or first third of orbit. *Teeth*—an outer row of about 10 large ones in the premaxillaries; outer row in lower jaw enlarged, elongate, and subhorizontal, the outer one or two teeth on either side large, obliquely placed, canines. *Fins*—the two dorsals of about equal height, and separated by a very short interspace. Caudal rounded. *Scales*—ctenoid, in front of dorsal fin they are very small, and are continued forwards to opposite the eyes, those on free portion of the tail are largest. *Colour*—greenish, back with from eight to ten darkish cross bars. Two longitudinal bands, the upper from snout through eye, at first black, becoming yellow on body and ending at extremity of soft dorsal; the second from the mouth becoming a black spot at base of pectoral, and continued as a golden band to centre of base of caudal; the last fin has a dark spot at the upper part of its base; anal with a dark margin.

Hab. Andamans, Malay Archipelago to Australia.

1021. (3.) Gobius sexfasciatus.

Gobius sexfasciatus, *Day, Fish. India,* p. 285, pl. lix, fig. 4.

D. 6 | 11. P. 19. V. 1/5. A. 10. C. 15.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, not $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{6}$ apart. Greatest width of head $\frac{4}{7}$ of length, its height equals length including snout. Anterior profile of head very obtuse. Lower jaw the longer; cleft of mouth oblique, maxilla reaches to below hind edge of eye. *Teeth*—in the mandibles smaller than in upper jaw, about 16 at anterior extremity of mandible, the outer recurved. *Fins*—third dorsal spine about as long as the body is high. Anterior dorsal rays not half so long as spines, last rays longest. Ventral does not reach the vent. Anal commences below second dorsal ray. Caudal wedge-shaped, extremity rounded. *Scales*—minute over body, somewhat larger towards tail. *Colour*—greyish brown, six dark bands descending from back to middle of sides; opercle covered with a large dull blotch. Fins greyish, stained darker at their edges. Upper half of caudal yellow, and barred with light brown spots. A black mark between first two dorsal spines, about halfway up.

Hab. A specimen was captured at Madras in June, 1867.

1022. (4.) Gobius brevirostris.

Gobius brevirostris, *Günther, Catal.* iii, p. 41; *Day, Fish. India,* p. 285, pl. lxiii, fig. 5.

D. 6 | 1/10–11. P. 17. V. 1/5. A. 10. C. 13. L. l. 44. L. tr.

Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of snout and apart. Upper profile of head parabolic. Width of head equals height and its length behind middle of orbit. Mouth oblique, the maxilla extends to below anterior third of orbit. *Teeth*—a recurved canine at either extremity of enlarged row in lower jaw. *Fins*—the second or longest dorsal spine is as long as postorbital portion of head. Ventral extends halfway to anus; caudal rounded. *Scales*—ctenoid, increasing in size behind; a few rows on the head in old specimens, none in young. *Colour*—olivaceous, a blotched irregular band from mouth to centre of base of caudal; a narrow brown band from eye to above opercle terminating above axilla in a large light blue ocellus. Two small bluish spots on opercle at its upper margin, another at upper edge of base of caudal. Basal half of dorsal fins violet. Anal white, with a violet band along its middle, lightish blue superiorly and white externally. Caudal with blackish margins.

Hab. Kurrachee to China.

1023. (5.) Gobius griseus.

Gobius griseus, *Day, Fish. India*, p. 285, pl. lxiii, fig. 3.

D. 6 | 1/10. P. 17. V. 1/5. A. 10. C. 14. L. l. 42. L. tr. 14.

Length of head $4\frac{2}{3}$, of caudal fin $5\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—upper margin near the dorsal profile; diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Head as wide as high or as its length without the snout. Lower jaw the longer, cleft of mouth rather oblique, the maxilla reaches to below first third of eye. Numerous rows of warts on the cheeks and opercles, which are but little apparent in the young. *Teeth*—outer row in premaxillaries much enlarged near symphysis; the outer eight or ten in front of lower jaw are still larger, and outermost on either side is a large recurved canine. *Fins*—spines of first dorsal ending in filamentous prolongations, and rather higher than body, base of fin ends close to commencement of second dorsal, the last ray of which reaches base of caudal. Pectoral as long as head; ventral reaches halfway to anal. Caudal wedge-shaped, but not pointed. *Scales*—ctenoid and angular, very small before the dorsal fin, extending as far as the eyes; the scales do not show a sudden increase in size under the commencement of second dorsal as in *G. brevirostris*. *Colour*—olivaceous, with bands and many well-marked deep brown or black spots. Pectoral fin and contiguous portions of body finely dotted with small chestnut spots. Base of first dorsal yellowish with three or four horizontal brown bands; second dorsal yellowish with a dark outer edge. Ventral, anal, and caudal with dark outer edges.

Hab. Madras, in the backwaters, up to $3\frac{1}{2}$ inches in length. This fish dies when placed in fresh water.

1024. (6.) **Gobius polynema.** (Fig. 89.)

Chæturichthys polynema, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Japan*, p. 44, fig. 4.
Gobius polynema, *Day, Fish. India*, p. 286, pl. lxi, fig. 8 (see synon.).

D. 6 | 11. P. 21. V. 1/5. A. 10. C. 13. L. l. 28–30. L. tr. 8.

Length of head 5, of caudal fin 4, height of body 6 to 8 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, about 1 diam. from end of snout, and $\frac{2}{3}$ apart. Head rather flat superiorly, as broad as high, or as its length excluding the snout. Snout moderately rounded, cleft of mouth oblique, jaws of equal length in front; the maxilla reaches to below first third of orbit. *Barbels*—several small ones below lower jaw, and nearer its posterior than its anterior extremity. *Teeth*—a small recurved canine tooth

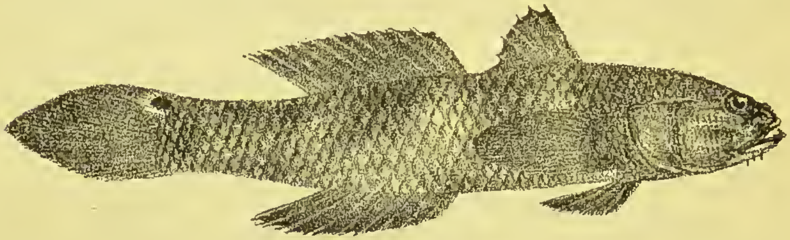

Fig. 89.—*Gobius polynema.*

on each side of enlarged row in lower jaw. *Fins*—first dorsal about half as high as body, lower than second, which is as high as the body; pectoral as long as head; ventrals reach two thirds of distance to anal; caudal pointed. *Scales*—ctenoid, extending forwards to snout and sides of head. *Colour*—purplish black, fins blackish; a black ocellus edged with white or yellow on upper portion of base of caudal fin.

Hab. Seas of India to China and Japan. Very common at Bombay throughout the year and not uncommon at Madras.

1025. (7.) **Gobius macrostoma.**

Gobiopsis macrostomus, *Steind. Sitzungsb. Wien. Akad.* 1860, xlii, p. 291, t. i, fig. 6.
Gobius macrostoma, *Day, Fish. India*, p. 286.

D. 6/11. A. 10. L. l. 33.

Length of head $3\frac{2}{3}$ to $3\frac{3}{4}$, pectoral $5\frac{3}{4}$, height of body $7\frac{1}{2}$ in the total length. *Eyes*—diameter $6\frac{3}{4}$ in length of head, 1 to $1\frac{1}{3}$ diam. apart. Head depressed, broader than high. Cleft of mouth extending to behind posterior margin of orbit. *Teeth*—canines present. *Scales*—cycloid anteriorly, ctenoid posteriorly. *Fins*—spines of first dorsal with filamentous terminations, not so high as

the body, soft dorsal higher than spinous or than body, the two dorsal fins a short distance apart. Caudal rounded. *Colour*—vertical fins with dark streaks.

Hab. Bombay.

1026. (8.) Gobius viridipunctatus.

Gobius viridipunctatus, *Day, Fish. India*, p. 286, pl. lxi, fig. 4, pl. lxiii, fig. 4 (abnormal), and pl. lix, fig. 5 (male), *Suppl.* p. 793 (see synon.).

Nuna mottah, Tel.; *Bichu gende*, Tam. "Scorpion goby."

D. 6 | 1/10. P. 20. V. 1/5. A. 1/9. C. 15. L. l. 34–38. L. tr. 9.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, of caudal fin $5\frac{1}{3}$, height of body $4\frac{2}{3}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, rather above 1 diam. from end of snout, and $\frac{1}{3}$ apart. Head as broad as high, or as its length behind middle of eyes. Cheeks swollen, with many rows of warts, and also pitted in large specimens; a large open pore in interorbital space. Lower jaw the longer, cleft of mouth oblique; the maxilla reaching to below middle of orbit. *Teeth*—an external enlarged row in premaxillaries, and two or four canines; in the lower jaw from 12 to 16 enlarged teeth, the outermost recurved canines, there are also from two to four canine-like teeth in the internal row above the symphysis. *Fins*—dorsal spines with short filamentous endings, height of first dorsal $\frac{2}{3}$ that of body; the second dorsal and anal vary considerably, the last ray sometimes reaches only $\frac{2}{3}$ of the way to the caudal, sometimes extends beyond the commencement of that fin. Caudal rounded. *Scales*—ctenoid, small anteriorly. *Colour*—olive, with a series of four or five large badly defined blotches along the sides; many scales with a light centre; this in life is emerald-green; dorsals dark at their bases, usually having light edges. Ventral, anal, and caudal grey, the last with a light upper edge.

Hab. Sind, to the Malay Archipelago; most common at Bombay and Madras; growing to at least 5 inches in length.

1027. (9.) Gobius ocellatus.

Gobius ocellatus, *Day, P. Z. S.* 1873, p. 107; *Fish. India*, p. 287, pl. lxi, fig. 7.

Kharbi, Maráthi.

D. 6 | 1/10. P. 20. V. 1/5. A. 1/10. C. 12. L. l. 33. L. tr. 8.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, of caudal fin 5 to 6, height of body 6 to 7 in the total length. *Eyes*—diameter 5 to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Head slightly broader than high, its width equal to length of postorbital portion. A pair of short barbels under symphysis of lower jaw. Cleft of mouth somewhat oblique; lower jaw a little the longer; maxilla extends to beneath anterior margin of orbit. *Teeth*—moderate or small recurved canines in mandibles and in large specimens in

upper jaw. *Fins*—the two dorsals not widely separated, second dorsal spine elongate in some specimens, being nearly as long as the head, last dorsal ray divided to base. Pectoral rays silk-like, second dorsal and anal about equally developed and highest posteriorly; caudal wedge-shaped, rounded behind; ventral reaches halfway to vent. *Scales*—ctenoid on body, cycloid on head, much smaller in front of dorsal fin; they cover the checks, opercles, and top of head to snout, and are in rather irregular rows. *Colour*—olive, a dark green spot above upper margin of opercle, about six indistinct blotches along sides; dorsal and caudal fins stained dark, and indistinctly spotted or barred; a yellow ocellus, with a black centre, at the top of the caudal fin in its last half; anal whitish, basal half covered with fine black dots; ventrals yellow.

Hab. Bombay and Sind, growing to 6 inches in length.

1028. (10.) Gobius masoni.

Gobius masoni, *Day, P. Z. S.* 1873, p. 107; *Fish. India*, p. 287, pl. lxi, fig. 6.

B. vii. D. 6 | 1/10–11. P. 19. A. 1/9. C. 12. L. l. 28. L. tr. 10.

Length of head $4\frac{1}{3}$, of caudal fin 5 to $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—somewhat superior, diameter $5\frac{1}{2}$ to 6 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Profile of head bluntly rounded, its width equalling its length excluding the snout, its height a little more; cleft of mouth oblique; lower jaw anterior, posterior extremity of maxilla extends to below middle of orbit. Numerous rows of fine wart-like glands along the opercles, nape, and mandibles. *Teeth*—an enlarged row in upper jaw, with two large canines; from 12 to 15, also enlarged, in front of lower jaw, on either side a very large recurved canine. *Fins*—first dorsal low, longest spine about half height of body; rays longer behind; pectoral destitute of silk-like rays; caudal wedge-shaped, rounded behind. *Scales*—ctenoid, rounded before first dorsal, and smaller than in remainder of body, where they are angular; none on cheeks, a few along upper margin of opercles. *Air-bladder*—large. *Colour*—olive, with numerous brilliant blue spots on nape and behind the pectorals; some blackish ones along the sides. Dorsal, anal, ventral, and caudal black; pectoral yellow, margined with black.

Hab. Bombay, growing to 4 inches in length.

1029. (11.) Gobius cyanomos.

Gobius cyanomos, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Blenn. en Gob.* p. 25; *Day, Fish. India*, p. 287, pl. lxi, fig. 5 (see synon.).

D. 6 | 1/10. P. 18. V. 1/5. A. 10. C. 11. L. l. 28–30. L. tr. 8.

Length of head $4\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $6\frac{1}{4}$ in the total length. *Eyes*—somewhat superior, diameter 5 to 6 in length of head, $1\frac{1}{3}$ diam. from end of snout, and $\frac{1}{2}$ apart. Greatest width of head $\frac{2}{3}$ of length, height equals length without snout. Cheeks swollen. The orifice of a canal behind posterior lower angle of eye. Mouth oblique, jaws of equal length, maxilla extends to below anterior third of orbit. *Barbels*—a short pair below symphysis of mandible. *Teeth*—anterior 10 in premaxillaries large and canine-like, the outer 10 or 12 in lower jaw also enlarged, but not to the same size, the external one on either side is a recurved canine. *Fins*—dorsal spines, especially second and third, filiform and prolonged far beyond membrane; rays increase in length to the last, which reaches base of caudal fin, and is as high as the body, it is divided to its base. Caudal wedge-shaped or rather rounded. *Scales*—small, rounded, and cycloid anteriorly; none on the head; those on remainder of the body angular and feebly ctenoid. *Colour*—olive, many of the scales with light bluish spots, a deep blue spot on shoulder, second dorsal and anal dark, with a reddish outer edge; ventral and last two thirds of caudal grey.

Hab. Seas of India to the Malay Archipelago.

1030. (12.) Gobius criniger.

Gobius criniger, *Cuv. & Val. H. N. Poiss.* xii, p. 82; *Day, Fish. India*, p. 288, pl. lxii, fig. 2 (see synon.).

D. 6 | 10. P. 19. V. 1/5. A. 10. C. 13. L. l. 26–32. L. tr. 12–13.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ to 4 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Snout obtuse; jaws of about the same length anteriorly. Cleft of mouth oblique; maxilla reaches to below front edge of first third of eye. Greatest width of head equals height, or length excluding snout. Several rows of fine warts across the cheeks, opercles, upper surface of head, and nape of neck; an open pore between eyes. *Teeth*—small recurved canines in lower jaw. *Fins*—the two dorsals with a narrow space between, and of about equal height or $\frac{1}{6}$ of total length, the second and third spines often with filamentous terminations; last dorsal ray divided to base. Pectoral of similar length to ventral. Caudal rounded. *Scales*—ctenoid, none in front of base of first dorsal. *Colour*—pale ochreous; head, body, dorsal and caudal fins irregularly spotted and blotched with black; caudal and anal with dark edges.

Hab. East coast of Africa, seas of India, to the Malay Archipelago and beyond. Common at Madras all the year round in the sea and backwaters.

1031. (13.) Gobius thurstoni.

Gobius thurstoni, *Day, Fish. India, Suppl.* 1888, p. 793.

D. 6 | 1/10. P. 22. V. 1/5. A. 10. C. 14. L. l. 30. L. tr. 8.

Length of head $4\frac{3}{4}$, of caudal fin $4\frac{2}{3}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—near dorsal profile, diameter $4\frac{1}{4}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Head $\frac{1}{5}$ wider than long, its height equals its length without the snout. Upper jaw slightly the longer, cleft of mouth rather oblique, posterior extremity of maxilla hardly reaching to beneath front edge of eye. A single row of warts across the cheeks. No barbels. *Teeth*—small canines in both jaws. *Fins*—first dorsal separated by a short interspace from second, spines flexible, the longest as high as body; last rays of second dorsal somewhat prolonged, $\frac{1}{4}$ longer than dorsal spines, and reaching to base of caudal fin. Pectoral as long as head, its lower rays the shortest, some of its upper rays silk-like. Ventral reaches vent; caudal wedge-shaped. *Scales*—strongly ctenoid and angular, before the dorsal fin comparatively small; none on head. *Colour*—slaty grey, with 5 rows of dark and interrupted narrow brown bands in anterior portion of body, becoming brown spots from pectoral fin, on base of which are two well-marked brown blotches. Numerous small blue spots on the body; first dorsal with brown spots; ventral black, and with a dark outer edge.

Hab. One specimen $4\frac{1}{2}$ inches long, sent by Mr. Thurston from Madras.

1032. (14.) Gobius puntang.

Gobius puntang, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 692 (? ii, p. 486); *Day, Fish. India,* p. 288, pl. lxii, fig. 1 (see synon.).

D. 6 | 1/10. P. 17. V. 1/5. A. 10. C. 11. L. l. 28–29. L. tr. 8–9.

Length of head $4\frac{1}{2}$ to $5\frac{1}{2}$, of caudal fin $3\frac{1}{3}$, height of body $4\frac{3}{4}$ to $5\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. Upper profile of head rounded, a considerable rise from snout to forehead. Greatest width of head $\frac{2}{3}$ and its height $\frac{3}{4}$ of its length. Cleft of mouth very slightly oblique, the maxilla reaches to below middle of orbit; two open pores between orbits. *Teeth*—the enlarged row in lower jaw ends laterally in small canines. *Fins*—dorsal spines with filamentous terminations, the first three longest and much longer than second dorsal, the hind rays of which are as high as the body and reach base of caudal. Pectoral as long as head and half longer than ventral. Caudal pointed. *Scales*—ctenoid, extending as far forward as the orbits, also on the cheeks and opercles. *Colour*—olive, spotted all over with rusty; fin-rays yellow, barred and dotted with purplish red. Anal with a yellow margin and sometimes with transverse purplish-red streaks.

Hab. Andamans to the Malay Archipelago; this species appears to prefer brackish water.

1033. (15.) Gobius bleekeri.

Gobius bleekeri, *Day, P. Z. S.* 1868, p. 195; *Fish. India*, p. 289, pl. lxii, fig. 5.

D. 6 | 1/9. P. 16. V. 1/5. A. 1/8. C. 13. L. l. 32. L. tr. 11.

Length of head 5, of caudal fin 6, height of body 5 in the total length. *Eyes*—directed upwards and slightly outwards, closely approximating superiorly; diameter $3\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout. Height of head equal to length excluding snout. Lower jaw the longer, cleft of mouth oblique, maxilla reaches to beneath anterior half of orbit. *Teeth*—a recurved conical canine on either side of mandibles. *Fins*—dorsal spines slender, with filamentous prolongations, and higher than rays. Pectoral $\frac{1}{4}$ longer than head, ventral does not reach anal; caudal wedge-shaped. *Scales*—ctenoid, extending as far forward as posterior margin of orbit, none on cheeks or base of pectoral, smaller in front of dorsal fin. *Colour*—olivaceous, clouded with darker blotches and irregular spots, very fine black spots on scales; first dorsal dusky in its upper half, with a large bluish spot extending from first to fourth spine, and a light mark along its base from that spine to end of fin, the spines orange; second dorsal studded with black points most numerous towards base, its first half minutely edged with white, some blue spots on its posterior half; anal covered with minute black points; pectoral orange, a blue ocellus on upper half of base, lowest ray deep blue: ventral blackish. Caudal nearly black, having three or four rows of bluish-white spots between each ray.

Hab. Madras; growing to $2\frac{4}{5}$ inches long.

1034. (16.) Gobius zonalternans.

Gobius zonalternans, *Day, Fish. India*, p. 289.

D. 6 | 1/9. P. 17. V. 1/5. A. 1/9. C. 13. L. l. 27. L. tr. 6.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{4}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{6}$ apart. Width of head equals half its length, and height equals length excluding snout. Lower jaw slightly the longer; maxilla reaches to below first third of eye. No warts or barbels on the head. *Teeth*—in the lower jaw a pair of large recurved canines. *Fins*—spines of first dorsal very thin, with filamentous terminations, and much higher than the body; last dorsal and anal rays long, reaching the caudal fin. Pectoral and ventral reach anal. Caudal pointed. *Scales*—cycloid, very small before first dorsal, and not extending to hind edge of eyes. *Colour*—a large blue spot surrounded with black on the opercle; body with angular brown bands from back to abdomen, the angle directed backwards; a dark band over tail just before base of

caudal fin, which has a black basal band; its outer half is grey. First dorsal with a white band along its base, and a dark blotch between last dorsal spines. Other fins dark grey.

Hab. Madras; two specimens obtained, up to $1\frac{3}{4}$ inch, from brackish water (Adyar river).

1035. (17.) Gobius biocellatus.

Gobius biocellatus, *Cuv. & Val. H. N. Poiss.* xii, p. 73; *Day, Fish. India*, p. 289, pl. lxiii, fig. 8 (see synon.).

D. 6 | 1/9. P. 19. A. 1/8. C. 15. L. l. 28–30. L. tr. 7–8.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 6, height of body 6 in the total length. *Eyes*—high up; diameter 4 to 5 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, $\frac{1}{4}$ apart. Height and breadth of head equal, and as long as head behind middle of eyes. Cleft of mouth rather oblique, lower jaw the longer; the maxilla reaches to below the middle of the orbit. A large open pore in posterior third of interorbital space. Several rows of fine warts on the cheeks. *Teeth*—a pair, recurved and canine-like, in lower jaw in large specimens. *Fins*—first dorsal spines weak, the fifth slightly the longest, the first as high as the second dorsal, the last ray of which is as long as the head; ventral extends beyond vent. *Scales*—ctenoid, none on cheeks; some on opercle, much smaller than those on rest of body, where they are angular. *Colour*—variable, generally greyish brown, with some large irregular blotches along the sides, and a slight brownish line along the middle of each row of scales. Dorsal fin generally yellowish, with a greyish tinge, and several irregular whitish lines along its lower half; usually also a black blotch with a white edge between its fifth and sixth spines; second dorsal with several rows of irregular white spots; pectoral, ventral, and anal greyish, the last with some white dots; caudal dark grey, with some lines of dark spots.

Hab. Coasts of India as high as Sind, extending to the Malay Archipelago.

1036. (18.) Gobius madraspatensis.

Gobius madraspatensis, *Day, P. Z. S.* 1868, p. 152; *Fish. India*, p. 290, pl. lxii, fig. 3.

D. 6 | 1/9. P. 17. V. 1/4. A. 1/9. C. 13. L. l. 28–29. L. tr. 7.

Length of head 5 to $5\frac{1}{4}$, of caudal fin $5\frac{1}{4}$ to 6, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—upper margin near profile; diameter 4 in length of head, $\frac{2}{3}$ diam. from end of snout, $\frac{1}{4}$ apart. Width of head equals postorbital length; height of head its length without snout. Some rows of warts across cheeks; two open glands in interorbital space. Cleft of mouth oblique, the lower jaw the longer; the maxilla extending to beneath the anterior margin of the orbit. *Teeth*—about 14 enlarged in the lower jaw, ending on each side in a large recurved canine. *Fins*—first dorsal spine with

a filamentous termination, the fin ending near the commencement of the second dorsal, which is rather higher. Pectoral as long as head, and equal to the ventrals. Anal commences below second or third dorsal ray. Caudal rounded. *Scales*—ctenoid, extending forwards nearly to posterior margin of orbit, smaller on nape than on remainder of body; none on the head. *Colour*—olivaceous, with irregular, ill-defined brownish blotches and dots; from five to eight very narrow vertical black lines from back to abdomen, between base of ventrals and middle of anal. Fins greyish, first dorsal with two rows of black blotches; second dorsal irregularly blotched and dotted. Pectoral and anal unspotted. Ventrals tipped with black. Caudal minutely dotted in rows.

Hab. Madras backwaters; growing to about 3 inches in length.

1037. (19.) Gobius neilli.

Gobius neilli, *Day, P. Z. S.* 1868, p. 152; *Fish. India*, p. 290, pl. lxii, fig. 4.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. l. 28. L. tr. 7.

Length of head $3\frac{1}{2}$, of caudal fin 5, height of body 4 in the total length. *Eyes*—directed upwards and slightly outwards; diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and less than $\frac{1}{6}$ apart. Head as broad as high, or as its length behind middle of eye. Cheeks swollen. No warts or barbels, but an open pore in front of interorbital space and another at posterior lower angle of eye; cleft of mouth very oblique; maxilla extending beneath anterior third of orbit. *Teeth*—a large recurved canine in lower jaw. *Fins*—first dorsal spines prolonged, termination of second in adult filamentous; pectoral as long as head; ventrals reach anal; caudal somewhat pointed. *Scales*—in regular rows, ctenoid, extending three fourths of distance from first dorsal to orbits; none on head. *Colour*—ochreous above, becoming dirty white on abdomen; cheeks, head, and upper two thirds of the body with various sized rusty brown spots of irregular shape, forming oblique bands on the head. Pectorals and ventrals unspotted; first dorsal with a black mark on basal half between first and fifth spine, above this it is yellow, the ends of the spines black, last two spines brown-spotted; second dorsal brown externally, with a longitudinal yellow and black band dividing it from the lower three fourths of the fin, which is spotted with light brown; caudal barred with eight or nine chestnut spots.

Hab. Madras; up to $3\frac{1}{4}$ inches in length.

1038. (20.) Gobius melanostictus.

Gobius melanosticta, *Day, Fish. India*, p. 290, pl. lxiii, fig. 2.

D. 6 | 1/8–9. P. 17. V. 1/5. A. 9. C. 13. L. l. 24. L. tr. 7.

Length of head 5 to $5\frac{1}{4}$, of caudal fin $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in

the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{1}{3}$ apart. Greatest width of head equals its height, or its length excluding the snout. Upper jaw slightly the longer; cleft of mouth oblique; the maxilla reaches to below the last third or middle of the eye. Scales cover opercles. *Teeth*—a pair of small recurved canines in lower jaw. *Fins*—first dorsal spines with filamentous terminations, the fin rather higher than the second, last rays of which are as high as body. Pectoral as long as head; ventral reaches halfway to vent. Caudal rounded. *Scales*—scarcely ctenoid. *Colour*—light brown, most of the body-scales with a dark spot or vertical mark; a dark blotch on opercle, and another below the eye. Dorsal and caudal fins with numerous dark spots forming bars. Pectoral with a dark mark at its base.

Hab. Backwaters of Madras; growing to 2 inches in length.

1039. (21.) Gobius microlepis.

Gobius microlepis, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Blenn. en Gob.* p. 35; *Day, Fish. India, Suppl.* 1888, p. 793 (see synon.).

D. 6 | 1/12. P. 22. V. 1/5. A. 1/13. C. 17. L. l. 50.

Length of head 6, of caudal fin 3 to $3\frac{1}{4}$, height of body from $7\frac{1}{3}$ to 9 in the total length. *Eyes*—high up, and placed rather close together; diameter 4 in length of head, and about 1 diam. from end of snout. Cleft of mouth oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. Snout obtuse. *Teeth*—in a single row without canines, those in upper jaw a little longer and further apart than those in lower jaw. *Fins*—both dorsals higher than body, in some examples fifth ray of first dorsal has a filamentous prolongation. Caudal lanceolate. *Colour*—greenish or brownish buff, with some clouded spots on back and sides, a black dot at edge of most scales; sometimes a black spot at base of caudal fin. Fine dark spots on dorsal rays; anal and caudal stained dark, especially externally.

Hab. Madras, to the Malay Archipelago and China.

1040. (22.) Gobius cristatus.

Euctenogobius cristatus, *Day, P. Z. S.* 1873, p. 109.
Gobius cristatus, *Day, Fish. India*, p. 291, pl. lxii, fig. 8 (see synon.).

D. 6/14. P. 21. A. 14. C. 13. L. l. 50–60. L. tr. 11–12.

Length of head $5\frac{1}{2}$, of caudal fin 3 to 4, height of body 6 in the total length. *Eyes*—rather high up, with a very narrow and concave interorbital space; diameter 4 in length of head, 1 diam. from end of snout. Greatest width of head equals length behind middle of eyes, height a little more. Cleft of mouth oblique, lower jaw the longer, the maxilla reaches to below middle of orbit. Several rows of fine warts across the cheeks. A low black-stained crest extends from nape to base of first dorsal. *Teeth*—a single row in upper jaw,

above two in lower. No canines. *Fins*—all spines in first dorsal elongated beyond the membrane; last rays of second dorsal the longest, the two fins close together. Caudal pointed and elongate. Ventral reaches vent. *Scales*—cycloid, in irregular rows and very small before the second dorsal. *Colour*—olivaceous; one or two black spots on posterior upper angle of eye; a light ocellus having a brown edge at base of pectoral; body blotched and spotted; some black bars on upper half of dorsal, and a badly defined violet ocellus edged with yellow on its last ray; caudal spotted in its upper half.

Madras specimens differ in having a light edge to the anal, ventrals dark grey, and no ocellus on the dorsal, whilst the caudal fin is longer.

Hab. Madras and Bombay, where, in the month of March, the species was breeding.

1041. (23.) Gobius tentacularis.

Gobius tentacularis, *Cuv. & Val. H. N. Poiss.* xii, p. 128; *Day, Fish. India,* p. 291, pl. lxiv, fig. 4 (see synon.).

D. 6 | 1/12. P. 20. V. 1/5. A. 1/13. C. 15. L. l. 60. L. tr. 10.

Length of head $5\frac{1}{2}$ to $6\frac{1}{2}$, of caudal fin $3\frac{2}{3}$, height of body 7 to 8 ($9\frac{1}{2}$) in the total length. *Eyes*—high up and close together; diameter $3\frac{3}{4}$ in length of head, 1 diam. from end of snout. Width of head equals its length behind middle of eye; height equals length excluding snout. Snout somewhat obtuse and rounded, cleft of mouth oblique, lower jaw the longer; the maxilla reaches to below last third of eye. A simple tentacle above posterior third of the eye, about $\frac{2}{3}$ length of orbit. *Teeth*—a single row in premaxillaries; two or three rows in lower jaw, without any canines. *Fins*—dorsal spines extending far beyond the membrane and equal to height of body, second dorsal about equally high, distance between bases of the two fins not so much as diameter of eye. Pectoral as long as head, and $\frac{1}{4}$ longer than ventral. Anal commences below origin of second dorsal; caudal acutely pointed. *Scales*—ctenoid in posterior part of body; they extend forward nearly to the eyes, none on crest or head; they are very much smaller in front of second dorsal and anal fins. An anal papilla. *Colour*—dull green, with some reddish spots. First dorsal with four to six narrow bands of horizontal spots, and six or eight along the second dorsal. Caudal grey, with some spots on its upper half. Anal grey, with a narrow white band at its base.

Hab. Seas of India to the Malay Archipelago.

1042. (24.) Gobius acutipinnis.

Gobius acutipennis, *Cuv. & Val. H. N. Poiss,* xii, p. 80; *Day, Fish. India,* p. 291, pl. lxi, fig. 2 (see synon.).

Mang-moo-goo-da-lah-dah, Andam.

D. 6 | 1/10-11. P. 19. A. 1/11. C. 19. L. l. 25-28. L. tr. 6/7.

Length of head from 5 to 6, of pectoral $4\frac{1}{2}$ to 5, of caudal fin 3 to $3\frac{2}{3}$, height of body 5 to 6, of first dorsal 3 to 4, of second dorsal 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{6}$ apart. Snout obtuse and rounded; cleft of mouth oblique. The maxilla reaches to beneath anterior edge of eye. Greatest width of head equals its length behind middle of eye, height equals length excluding snout. A narrow row of warts across the cheeks, a large opening of mucous canals opposite posterior lower angle of orbit. *Teeth*—no canines. *Fins*—spines of first dorsal weak, with filamentous terminations; last dorsal ray divided at its base. Caudal lanceolate. *Scales*—angular, ctenoid, none in front of first dorsal fin. *Colour*—greyish brown above, becoming dull white beneath; four or five (sometimes more) dull blotches almost forming bands from the back down the sides; a dark mark at base of caudal fin; a brown band from eye to behind angle of mouth; four lines of spots or bands along both dorsal fins; some obscure brownish bands sometimes present on the caudal, especially on its central rays; the fins generally dark grey, with a light outer edge. Pectoral, ventral, and anal stained slate-colour.

Hab. Seas of India to the Andaman Islands; very common up to $3\frac{1}{2}$ inches in length.

1043. (25.) Gobius striatus.

Euctenogobius striatus, *Day, P. Z. S.* 1868, p. 272, fig.
Gobius striatus, *Day, Fish. India*, p. 292, pl. lxii, fig. 6 (see synon.).

Coondallum and *Coondallum oolaway*, Tam.; *Mahturi, Naolli* (young), Ooriah.

D. 6 | 1/10. P. 15. A. 10. L. l. 56-60. L. tr. 14. Vert. 11/16.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 5 to $5\frac{3}{4}$, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—not prominent, directed upwards and outwards; diameter 6 to 7 in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. Body elongate; sides compressed. Snout elongate, cheeks inflated. Head $\frac{4}{7}$ as broad as long, height $\frac{1}{2}$ of length. No tentacles. Cleft of mouth nearly horizontal; the maxilla reaches to nearly below front edge of eye. *Teeth*—no canines. *Fins*—first dorsal spines weak, not filamentous, and $\frac{3}{4}$ height of body; second dorsal rays of about the same height; last dorsal ray divided to its root, it only reaches halfway to base of caudal; caudal slightly rounded. *Scales*—ctenoid, those anterior to dorsal fin smaller than the rest on the body; none on head. *Colour*—generally light fulvous, with a bluish tinge along the sides, becoming dirty white beneath; some irregular bands pass from the back towards the middle of the body, also some thin black lines proceed upwards on the abdomen opposite to the anal fin; cheeks glossed with silver; pectoral, ventral, and anal whitish yellow;

both dorsals diaphanous, with five or six rows of brown dots; caudal with eight or nine vertical rows of spots in its upper half or two thirds.

Hab. Fresh and backwaters of Madras, Canara, and Orissa.

1044. (26.) Gobius personatus.

Gobius personatus, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Blenn. en Gob.* p. 34, *and Batavia Nat. Tijdsch.* i, 1851, f. 4; *Day, Fish. India,* p. 292, pl. lxiii, fig. 6 (see synon.).

D. 6 | 1/10. P. 16. V. 1/5. A. 1/10. C. 12. L. l. 55. L. tr. 14.

Length of head $3\frac{3}{4}$ to 4, of caudal fin 5 to $5\frac{1}{2}$, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 in length of head, 2 diam. from end of snout, and nearly 1 apart. Greatest width of head equals its length behind middle of eyes, height half its length. No warts or tentacles on the head. Cleft of mouth slightly oblique, upper jaw a little the longer; the maxilla reaches to below the front edge of the eye. *Teeth*—no canines. *Fins*—dorsal spines with filamentous terminations as high as the body, and equalling last rays of dorsal fin, which are longest and extend to base of caudal. Pectoral $\frac{3}{4}$ length of head and $\frac{1}{4}$ longer than ventral. Caudal cut nearly square. *Scales*—ctenoid, much smaller before dorsal fin, extending forwards as far as the eye; those on body angular. *Colour*—light brown, a little darker along the back and upper surface of the head, a black spot at posterior upper angle of opercle; head and upper two thirds of body with numerous vermiculated black lines and spots; dorsal fin with three or four rows of spots forming bars, and sometimes a dark mark in the outer half from fifth spine to end of fin. Anal with a white outer edge. Caudal with five or six angular bars or irregularly placed spots.

Hab. Seas of India to the Malay Archipelago, apparently preferring estuaries and backwaters. The colour appears subject to considerable variation.

1045. (27.) Gobius malabaricus.

Gobius malabaricus, *Day, P. Z. S.* 1865, p. 27; *Fish. India,* p. 293 (see synon.).

D. 6 | 1/10. P. 13. V. 1/5. A. 1/10. C. 13. L. l. 50. L. tr. 9.

Length of head 5, of caudal fin 4, height of body 5 in the total length. *Eyes*—diameter 6 in length of head, 1 diam. from end of snout, $\frac{1}{2}$ apart. Height of head $\frac{2}{3}$ of its length, snout obtuse; cleft of mouth oblique, lower jaw the longer; maxilla extends to beneath anterior third of orbit. *Teeth*—no canines. *Fins*—dorsal spines weak, not filiform, not quite so long as second dorsal, the last rays of which reach base of caudal, which is rounded, with the middle rays rather the longest. *Scales*—ctenoid, angular, none on the head. *Colour*—light brown, with irregular dusky bands on the back and sides, a dark band descends from the eye, and some brown

blotches about the head. A deep black crescentic mark on first dorsal, commencing between second and third spines and continued to the last, above this is a white curved band bordered with black. Second dorsal, anal, and caudal brownish, barred with several rows of darker spots.

Hab. Backwaters in Madras, also in some of the rivers of Malabar; growing to about 4 inches in length.

1046. (28.) Gobius planifrons.

Gobius planifrons, *Day, P. Z. S.* 1873, p. 108; *Fish. India*, p. 293, pl. lxiii, fig. 9.

D. 6 | 1/10. P. 19. V. 1/5. A. 10. C. 13. L. l. 46. L. tr. 15.

Length of head $4\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—very high up; diameter 6 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Greatest width of head equals length excluding snout, its height equals half its length. Upper surface of head flat. Cleft of mouth horizontal, the jaws of about the same length; the maxilla reaches two diameters of the orbit behind its posterior edge. Fine tentacles near the nostrils, and rows of warty glands along the scaleless head. *Teeth*—a little enlarged; no canines. *Fins*—first dorsal low, about half as high as body; the second higher; ventral reaches halfway to anal; caudal rounded. Anal papilla rather large. *Scales*—those on body finely ctenoid, the rows very irregular, they extend forward to half-way between first dorsal and hind edge of eye. *Colour*—olive; fins very dark grey, second dorsal spotted; a black blotch at base of pectoral.

Hab. Bombay.

1047. (29.) Gobius elegans.

Gobius elegans (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* xii, p. 58; *Day, Fish. India*, p. 293 (see synon.).

D. 6 | 1/10. P. 18. V. 1/5. A. 1/9. C. 18. L. l. 36. L. tr. 9.

Length of head 5, height of body 6 in the total length. Snout obtuse. *Teeth*—small and equal. *Fins*—first dorsal rather lower than second, which is as high as body. Caudal rounded. *Colour*—buff, with a tinge of olive, minutely dotted with brown; the upper half of sides with three or four indistinct lines, each formed by a series of very short brown streaks, beneath are a series of indistinct brown spots; a blackish spot at posterior margin of orbit; a second at upper part of root of pectoral fin, and a third at lower part of root, spreading on to gill-membrane. Membranes of fins very pale bluish green, minutely clouded with brown; those of the dorsals, particularly the second, with three or four indistinct series of blackish spots, and a few similar on the caudal membrane. The rays of the anterior dorsal have two or three series of brown spots. Iris pale greenish silvery, minutely dotted with brown. (*Cantor.*)

Hab. Bombay to the Malay Archipelago; this appears to be a small marine or estuarine species.

1048. (30.) Gobius ornatus.

Gobius ornatus, *Rüpp. Atl. Fische*, p. 135; *N. W., Fische*, p. 137; *Day, Fish. India*, p. 294, pl. lxiii, fig. 1 (see synon.).

D. 6 | 1/10. P. 21. V. 1/5. A. 1/8–9. C. 13. L. l. 26–28. L. tr. 7.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 5, height of body 6 to 7 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, $\frac{1}{4}$ apart. Snout obtuse, convex. Head as broad as high, breadth equalling two thirds of length. Jaws about equal. Cleft of mouth very slightly oblique, the maxilla reaching to below first third of orbit. *Teeth*—in villiform rows, no canines. *Fins*—first dorsal somewhat lower than the second or than the body. Pectoral as long as the head; caudal rounded. *Scales*—ctenoid, extending on to crown of head. *Colour*—green, with numerous oblong brown spots, generally in three or four rows; also yellow dots in the centre of some of the scales; all the fins, except the ventral, dotted with black.

Hab. Red Sea to the Malay Archipelago.

1049. (31.) Gobius gutum.

Gobius gutum, *Ham. Buch. Fish. Ganges*, pp. 50, 366; *Day, Fish. India*, p. 294 (see synon.).

D. 6 | 1/10. P. 13. V. 1/5. A. 11. C. 17.

Head small, narrower than the body. *Eyes*—small. Mouth large, the upper jaw the longer. *Teeth*—sharp. *Fins*—pectoral and caudal rounded. *Scales*—ctenoid. *Colour*—greenish, with many black dots clustered into irregular spots resembling clouds in form: dorsal and caudal fins spotted. A figure of this species $2\frac{3}{10}$ inches in length exists amongst Hamilton Buchanan's MSS. drawings at Calcutta.

Hab. Lower portion of the Hooghly; growing to three or four inches in length.

1050. (32.) Gobius albopunctatus.

Gobius albopunctatus, *Cuv. & Val. H. N. Poiss.* xii, p. 57; *Day, Fish. India*, p. 294, pl. lxiii, fig. 7 (see synon.).

D. 6 | 1/9. P. 21. V. 1/5. A. 1/8. C. 13. L. l. 35–40. L. tr. 11–12.

Length of head $4\frac{1}{4}$ to $4\frac{3}{4}$, of caudal fin $4\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head equals its length excluding the snout, whilst its height equals its length behind the eye. Cleft of mouth slightly oblique, the maxilla reaching to below the first third of eye. *Teeth*—no canines. *Fins*—first dorsal lower than, or equal to, the second, the anterior rays of which equal the height of the body. Ventral does not quite reach anus. Caudal rounded. *Scales*—those on the nape rounded, cycloid, those on the rest of the body feebly ctenoid. An anal papilla. *Colour*—brownish, irregularly marbled; sides of head and body studded with white spots; dorsal and caudal greyish, dotted with

black, forming three rows on the first and second dorsal fins; the other fins unspotted. In some instances the dorsal, caudal, and pectoral are blackish, with a row of white dots.

Hab. Red Sea, Andamans, Mauritius, Feejee Islands, and Port Essington.

1051. (33.) Gobius giuris.

Gobius giuris, *Ham. Buch. Fish. Ganges*, pp. 51, 366, pl. 33, fig. 15 *Day, Fish. India*, p. 294, pl. lxvi, fig. 1 (see synon.).

Kharpa, Maráthi; *Wartee-poolah, Pooan*, and *Kurdán*, Mal.; *Nullatan, Oolooway*, Tam.; *Tsikideondoa* and *Issakee doondoo*, Tel.; *Gulah* and *Bali gulah*, Ooriah; *Nga-ka-tha-boh*, Burmese; *Owcha fo*, Arraean *B'ailla*, Chittagong; *Poo-dah*, Andam.; *Ab-bro-ny*, Canarese; *Goo-loo-wah*, and *Boul-la*, Punj.; *Gooloo*, Sind. and N.W. Prov.

B. iv. D. 6 | 1/8–9. P. 20. A. 1/8–9. C. 17. L. l. 30–34. L. tr. 8–9.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 4 to $5\frac{1}{2}$, height of body 5 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 to 8 in length of head, 2 to $2\frac{1}{2}$ diam. from end of snout, and $\frac{1}{3}$ to $\frac{3}{4}$ apart. Interorbital space slightly concave, with an open gland. Width of head $\frac{1}{2}$ to $\frac{3}{5}$ of length, height about $\frac{1}{2}$ the length. Lower jaw the longer, the maxilla extends to below anterior edge of orbit. *Teeth*—no canines. *Fins*—length of spines and rays variable, as might be anticipated in a fish which is so extensively used for stocking ponds. In some the spines of first dorsal are a little higher than the body, in others a little lower; sometimes the posterior rays of second dorsal reach above caudal, in others not above halfway to that fin. Caudal somewhat pointed or rounded. *Scales*—extend above nearly to hind edge of eyes, before the dorsal fin they are smaller than those on the body, which are angular and ctenoid. *Colour*—variable, generally fawn-colour, with cloudy markings on the head, and irregular bands, spots or blotches on the back and sides of body; vertical fins spotted.

Hab. East coast of Africa, and in all pieces of fresh water throughout the plains of India, Ceylon, Burma, Sind, the Malay Archipelago and beyond; attaining a foot and a half in length. The variety (? species) *G. kokius* never exceeds a span, and appears to be entirely confined to the sea and estuaries all along the coasts of India, and also at the Andamans. This form has a narrow snout, four or five large blotches on the sides, and the fins with rows of spots.

1052. (34.) Gobius semidoliatus.

Gobius semidoliatus, *Cuv. & Val. H. N. Poiss.* xii, p. 67; *Day, Fish. India*, p. 295, pl. lix, fig. 6 (see synon.).

B. v. D. 6 | 1/9. P. 17. V. 1/5. A. 8. C. 13. L. l. 28. L. tr. 9.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $4\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{2}$ apart. Dorsal profile more convex than abdominal. Greatest width of head equals length behind middle of eyes, its height slightly more. Lower jaw the longer, cleft of

mouth oblique; maxilla reaches to below middle of orbit. Neither scales, row of warts, nor barbels on the head. *Teeth*—last of outer row in lower jaw is slightly recurved, but can scarcely be considered a canine. *Fins*—dorsal spines having filamentous terminations, the fin is at least as high as the body, and $\frac{1}{3}$ higher than the second. Pectoral as long as the head. Caudal rounded. *Scales*—strongly ctenoid. *Colour*—chestnut, with three rather wide, pale, black-edged, transverse interorbital bands; between the eye and dorsal fin are three more bands which cross the back, and four or five more descend from below the commencement of the second dorsal fin to $\frac{1}{3}$ down the sides. Three bands descend from the eye, another over the opercle, and one in front of the pectoral fin. Both dorsal fins with brown spots.

Hab. Red Sea to the Andamans. I obtained two small specimens at the Andamans.

1053. (35.) Gobius magniloquus.

Gobius magniloquus, *Day, Fish. India*, p. 296.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. l. 38. L. tr. 10.

Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{3}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. Greatest width of head equals half its length; its height equals its length behind the eyes. Snout slightly depressed. Cleft of mouth rather oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. *Teeth*—outer row enlarged, but without canines, two or three posterior canines in the middle line above the symphysis of the lower jaw. *Fins*—dorsal spines with filamentous terminations, $\frac{2}{3}$ as high as the body; an interspace of five scales between bases of two dorsal fins; last dorsal rays are two thirds height of body and reach halfway to base of caudal. Pectoral as long as the head behind the eyes. Caudal wedge-shaped. *Scales*—ctenoid, extending forwards to opposite hind edge of eyes, where there is a large one (as in an *Ophiocephalus*); 15 rows between it and base of first dorsal scarcely smaller than those on body. Opercles scaled. *Colour*—light brown, covered with fine black dots and spots on the scales; a dark band from eye across opercles; a dark spot on upper edge of base of pectoral. Dorsal and caudal spotted in rows.

Hab. Madras; growing to $1\frac{3}{4}$ inches in length.

1054. (36.) Gobius planiceps.

Gobius planiceps, *Day, Fish. India*, p. 296.

D. 6 | 1/8. P. 17. V. 1/5. A. 9. C. 13. L. l. 38. L. tr. 10.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{3}{4}$, height of body $4\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Head broad and flattened superiorly, its greatest width equalling its length behind middle of eyes, its height rather less. Cleft of mouth oblique; maxilla extends to below

middle of eye. *Teeth*—no canines. *Fins*—dorsal spines $\frac{2}{3}$ height of body, a distance equal to four scales between bases of two dorsal fins; last dorsal ray divided to its base, and nearly as high as the body. Caudal rounded. *Scales*—ctenoid, they suddenly become larger below the second dorsal fin, where they are angular. *Colour*—dark brown, every scale on the body with a dark purplish band down its centre; a dark spot above axilla. A black band across base of pectoral. Caudal with eight angular bars of spots.

Hab. Madras; attaining $1\frac{1}{2}$ inches in length.

1055. (37.) Gobius sadanundio. (Fig. 90.)

Gobius sadanundio, *Ham. Buch. Fish. Ganges*, pp. 52, 366; *Day, Fish. India*, p. 296, pl. lxiii, fig. 10, *Suppl.* 1888, p. 793 (see synon.).

Oontoo-mossal, Mugh (Akyab).

D. 6 | 1/8. P. 19. V. 1/5. A. 1/8. C. 15. L. l. 28–30. L. tr. 8.

Length of head $4\frac{1}{2}$, of caudal fin 5 to 6, height of body $4\frac{1}{2}$ to 5. *Eyes*—diameter from 3 to $3\frac{1}{2}$ in length of head, $\frac{1}{4}$ to $\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Greatest width of head equals its length excluding the snout, and its height is a little more. Mouth almost horizontal; jaws of equal length; the maxilla reaches to below the middle or last third of the orbit. *Teeth*—no canines. *Fins*—second and third dorsal spines elongate, filamentous; four scales between the two dorsal fins. Caudal rounded. *Scales*—ctenoid; they exist on the opercles and are extended on the head

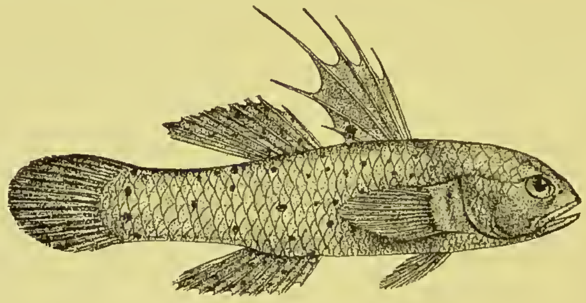

Fig. 90.—*Gobius sadanundio.*

to between the eyes, on the cheeks they are rudimentary. *Colour*—olive, with very large deep black, white-edged blotches scattered over the body; first dorsal black, with a white ring on its last three rays, second dorsal with two rows of black spots along its base, and a third of white dots along its centre. Ventral black in the centre, and having orange edges. Anal dark olive, margined with black. Caudal with numerous fine black dots.

Hab. Mouths of the Ganges, and along the Chittagong and Burmese coasts; attaining at least 3 inches in length.

1056. (38.) Gobius littoreus.

Gobius littoreus, *Day, P. Z. S.* 1888, p. 261; *Fish. India, Suppl.* p. 793.

D. 6/11. P. 15. V. 1/5. A. 10. C. 14. L. l. 22. L. tr. 6.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from the end of the snout and close together. The greatest width of head $\frac{2}{3}$ of its length, height equals length excluding snout. Anterior profile of head somewhat obtuse. Cleft of mouth oblique, lower jaw slightly the longer; maxilla reaches to beneath first third of eye. No warts on the head. *Teeth*—none enlarged. *Fins*—dorsal spines of moderate strength, the longest nearly half the length of the head. Pectoral as long as the head, some of its rays fine and silk-like; caudal pointed. *Scales*—finely ctenoid, none on the head. *Colour*—yellowish, with a few dark spots on the body and a dark band from the eye to the snout, also a dark mark on the opercle. Upper half of eye black. Dorsal, anal, and caudal fins with a grey outer edging; ventrals white.

Hab. A small species from Madras.

1057. (39.) Gobius melanosoma.

Gobius melanosoma, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 703; *Day, Fish. India,* p. 297, pl. lxiv, fig. 1 (see synon.).

D. 6 | 1/8. P. 21. A. 10. C. 15. L. l. 22–25. L. tr. 8–9.

Length of head 3 to $3\frac{1}{3}$, of caudal fin 5, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ diam. apart. Form of body elevated and compressed. Anterior portion of head and jaws covered with warty tubercles and fine hairy barbels. Cleft of mouth very oblique; the maxilla reaching to below the front margin of the eyes. Height of head equals length without snout. *Teeth*—villiform, with one or two posterior canines above the symphysis of the lower jaw. *Fins*—first dorsal somewhat higher than second, but not quite half height of body; the last dorsal ray reaches rather above halfway to base of caudal. Pectoral as long as head excluding snout; ventral reaches halfway to anal. Caudal rounded. *Scales*—ctenoid, extending forwards to opposite middle of first dorsal fin. *Colour*—brownish, the head may be light-coloured; dorsal, anal, and caudal very dark; ventrals nearly black, having a reddish edge; caudal reddish.

Hab. Andamans and Nicobars to the Malay Archipelago. This appears to be a small species.

1058. (40.) Gobius nunus.

Gobius nunus, *Ham. Buch. Fish. Ganges,* pp. 54, 366; *Day, Fish. India,* p. 297 (see synon.).

D. 5 | 1/9. P. 17. V. 1/5. A. 9. C. 15. L. l. 30. L. tr. 7.

Length of head $4\frac{1}{3}$, of caudal fin 5, height of body 5 in the total length. *Eyes*—small, in anterior part of head, 1 diam. from end of snout. Greatest width of head equals its height and half its length. Cleft of mouth very oblique, lower jaw the longer; the maxilla reaches to below the hind edge of the eye. *Teeth*—external row in lower jaw enlarged, the outer tooth rather recurved. *Fins*—first dorsal spines with filamentous prolongations; caudal wedge-shaped. *Scales*—ctenoid, extended over head and cheeks. *Colour*—reddish brown, with seven black belts, the first through the eye, the second over the opercles, and five more down the body, the last at root of caudal fin, these bands are extended on to the vertical fins.

Hab. River Hooghly, also Burma in streams; the specimen described is hardly an inch in length.

2. Genus **GOBIODON**, Bleeker.

Gill-openings of moderate width. Body oblong and compressed; head large. Teeth conical and fixed; a pair of posterior canines generally present near the symphysis of the lower jaw. Two dorsal fins, the first with six spines and united at its base to the second; ventrals united. Scales absent.

Geographical Distribution. Coasts of Indian Ocean.

Synopsis of Indian Species.

Head with vertical orange stripes; two or three orange bands or rows of blotches on the body	1. *G. rivulatus*, p. 270.
Brown, with black fins	2. *G. erythrospilus*, p. 271.
Blue black-edged vertical streaks on head; another band along bases of dorsal and anal fins..........................	3. *G. citrinus*, p. 271.

1059. (1.) Gobiodon rivulatus.

Gobius rivulatus, *Rüpp. Atl. Fische*, p. 136, & *N. W., Fische*, p. 138; *Day, Fish. India, Suppl.* 1888, p. 794 (see synon.).
Gobiodon quinquestrigatus (*Cuv. & Val.*), *Day, Fish. India*, p. 297 (see synon.).

D. 6 | 1/10–11. P. 19. V. 1/5. A. 1/8–9. C. 15.

Length of head 4, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Body elevated and strongly compressed. *Teeth*—two large posterior canines above symphysis of lower jaw. *Fins*—first dorsal only half as high as the second, which is as high as length of the head behind middle of eyes. Ventrals reach $\frac{1}{3}$ of the way to the anal. Caudal rounded. *Colour*—head with five

vertical orange stripes; two irregular bands of the same colour pass along the body, breaking up into blotches, a row of spots along the posterior third of the body, sometimes a black spot at tip of opercle. The colours fade in spirit.

Hab. Andamans and Nicobars, growing to $2\frac{1}{4}$ inches in length; also in the Malay Archipelago.

1060. (2.) Gobiodon erythrospilus.

Gobiodon erythrospilus, *Bleeker, Archiv. Néerland.* x. 1875, p. 122; *Day, Fish. India*, p. 298 (see synon.).

D. 6 | 1/10–11. P. 19. V. 1/5. A. 1/9. C. 15.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, less than 1 diam. from end of snout, and $\frac{1}{2}$ to $\frac{2}{3}$ apart. Cleft of mouth slightly oblique. *Teeth*—two small posterior canines above symphysis of lower jaw. *Fins*—in some specimens the first dorsal spine is somewhat produced, otherwise the two dorsal fins are of about the same height or half of that of the body. Ventral reaches $\frac{1}{3}$ of way to the anal. Caudal rounded. *Colour*—body brown, covered with small black spots, fins blackish. Caudal sometimes with a white base, or entirely white.

Hab. Ceylon, Andamans, Nicobars, to the Malay Archipelago.

1061. (3.) Gobiodon citrinus. (Fig. 91.)

Gobius citrinus, *Rüpp. N. W., Fische*, p. 139, t. xxxii, fig. 4.
Gobiodon citrinus, *Day, Fish. India*, p. 298, pl. lxiv, fig. 2 (see synon.).

D. 6 | 1/10. P. 20. V. 1/5. A. 1/8–9. C. 13.

Length of head 4, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, $\frac{3}{4}$ diam. from end of snout and also apart. Cleft of mouth slightly oblique. *Teeth*—a posterior enlarged row in lower jaw, the outermost of which are

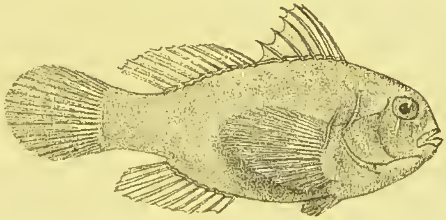

Fig. 91.—*Gobiodon citrinus.*

lateral recurved canines. *Fins*—dorsals of about the same height, and as long as head excluding snout; rays of second dorsal and anal almost reach base of caudal. Ventral reaches halfway to anal. *Colour*—yellow, a blue black-edged horizontal streak goes

along the bases of the dorsal and anal fins, in some specimens higher than in others; there are four similar vertical bands, two descending from the eye, one from summit of head to opercles, and a fourth in front of pectoral fins. A black spot at posterior extremity of opercle.

Hab. Red Sea, Andamans, and Nicobars.

3. Genus **SICYDIUM**, Cuv. & Val.

Syn. *Sicyopterus*, Gill; *Cotylopus*, Guich.; *Sicydiops* and *Microsicydium*, Bleeker.

Branchiostegals four or five; pseudobranchiæ; a slit behind the fourth gill. Body subcylindrical. Upper jaw rather prominent, cleft of mouth nearly horizontal. Teeth in the upper jaw small, one row mostly implanted in the gums, and as a rule movable, their apices may be compressed and dilated or bilobed; in the lower jaw they are in one or two rows, if two, the outer is fine and movable. Two dorsal fins, the first with six flexible spines; the caudal not united to the dorsal or the anal; ventrals united, forming a disk, which is more or less adherent to the abdomen. Scales ctenoid, of varying size. Air-bladder absent.

Geographical Distribution. This genus has a wide range in fresh and brackish waters, having been captured in Mauritius, Bourbon, Burma, the Malay Archipelago and beyond; also in the West Indies.

Synopsis of Indian Species.

L. tr.* 16. A dark interorbital band	1. *S. halei*, p. 272.
L. tr. 25. Vertical bands	2. *S. griseum*, p. 273.
L. tr. 19. Brown, banded, spotted, and with dark fins	3. *S. fasciatum*, p. 273.

1062. (1.) **Sicydium halei.**

Sicydium halei, *Day, Fish. India, Suppl.* 1888, p. 794.

B. v. D. 6/12. P. 19. V. 1/5. A. 11. C. 14. L. l. 56. L. tr. 16.

Length of head $5\frac{1}{2}$, of caudal fin $7\frac{1}{4}$, height of body 7 in the total length. *Eyes*—upper margin on dorsal profile, diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Interorbital space nearly flat, snout obtuse and rounded. Upper jaw the longer and overhung by the snout; lips thick. *Teeth*—upper, in two rows divided by a considerable interspace, the outer movable, almost horizontal; a large recurved canine on either side of symphysis of lower jaw. *Fins*—spines of first dorsal ending in filamentous prolongations, but the longest is not quite so

* Between origin of second dorsal and that of anal, see note, p. 247.

high as the body below it. A considerable interspace between first and second dorsal fins; the rays of the latter are equal to about half the height of the body. Ventral does not extend halfway to the anus. Caudal rounded at the extremity. *Scales*—strongly ctenoid, the first few anterior rows somewhat small, the remainder on the body of about the same size. *Colour*—greenish brown, a black inter-orbital band from eye to angle of mouth; some dark vertical bands on body; a dark outer edge to ventral and anal, also a dark band to outer edge of caudal, margined externally with white, which is widest at the angles.

Hab. Ceylon, whence Mr. Haly has sent me an example 3 inches long.

1063. (2.) Sicydium griseum.

Sicydium griseum, *Day, Jour. Linn. Soc., Zool.* xiii, 1878, p. 140; *Fish. India*, p. 747.

B. iv. D. 6 | 1/10. P. 17. V. 6. A. 11. C. 13. L. l. 80. L. tr. 25.

Length of head $5\frac{1}{2}$, of caudal fin $6\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, rather above 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Lips thick, the edge of the upper coarsely fringed. Snout not overhanging the mouth. *Teeth*—the outer row in lower jaw horizontal, posterior to them and opposite the symphysis are two strong recurved canines. *Fins*—dorsal spines filiform, projecting beyond the membrane; caudal rounded. *Scales*—strongly ctenoid, of irregular sizes and shapes, and in irregular rows; they extend forwards nearly to the eyes; none on sides of head. *Colour*—brownish, with eight or nine rings of a darker tint encircling the body, and wider than the ground-colour. Fins dark, most deeply so at their edges.

Hab. South Canara, where I procured two examples in fresh water, the largest 3 inches in length.

1064. (3.) Sicydium fasciatum. (Fig. 92.)

Sicydium fasciatum, *Day, Fish. India*, p. 299, pl. lxiv, fig. 7.

B. iv. D. 6 | 1/10. P. 17. V. 6. A. 11. C. 13. L. l. 67. L. tr. 19.

Length of head $5\frac{1}{4}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, nearly $1\frac{1}{2}$ diam. from end of snout, and $1\frac{3}{4}$ apart. Body subcylindrical; head rather flattened superiorly and broader than high; lips rather thick; snout overhanging the mouth. *Teeth*—inner row in lower jaw large, conical, recurved, some distance apart, with two canines near the symphysis. *Fins*—dorsal spines filiform, projecting beyond the membrane, $\frac{3}{4}$ as high as the body, and $\frac{1}{3}$ higher than second dorsal. Ventrals short, forming a complete disk, and not reaching halfway to the anal fin. Caudal rounded. *Scales*—strongly ctenoid, somewhat irregularly arranged, extending forwards nearly

as far as the eyes; those anterior to the dorsal fin and anal smaller than the others, and more or less cycloid. None on opercles or cheeks. *Colour*—reddish brown, with about six vertical darker

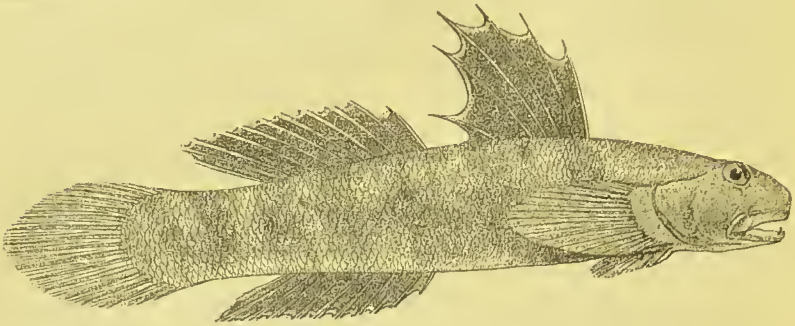

Fig. 92.—*Sicydium fasciatum.*

bands on body wider than ground-colour; there are also some dark spots; the under surface is dirty yellowish brown. Fins nearly black, with a light, nearly white, edge.

Hab. Burma, growing to $2\frac{1}{4}$ inches in length.

4. Genus **APOCRYPTES**, Cuv. & Val.

Branchiostegals four; pseudobranchiæ rudimentary; gill-openings of moderate width. Body elongate. Teeth conical in a single fixed row in either jaw, with usually a pair of canines in the lower, and above the symphysis, posterior to the fixed row; sometimes canines in the upper jaw. The first portion of the dorsal fin contains five or six flexible spines. Ventrals united, forming a disk, and only attached by their bases. Scales, when present, small, becoming larger posteriorly.

Geographical Distribution. Coasts of India, Burma, Andamans, and the Malay Archipelago. The species ascend estuaries and rivers, sometimes even above tidal influence.

Synopsis of Indian Species.

A. Less elongate, height 7 to 9 times in total length.
  a. The two dorsals not united.
    a'. Scales towards tail regular. Six rows between posterior terminations of dorsal and anal .... 1. *A. serperaster*, p. 275.
    b'. Scales small and irregular throughout.
      D. 5 | 31–32. A. 29–30 .... 5 *A. lanceolatus*, p. 277.
      D. 5 | 21–22. A. 33 .... 7. *A. bato*, p. 278.
  b. The two dorsals united at the base ...... 3. *A. bleekeri*, p. 276.
B. More elongate, height 11 to 14 in total length.
  a. Dorsals not united .... 4. *A. batoides*, p. 277.

b. Dorsals united.
D. 6/24–27. A. 25–29. Caudal fin $\frac{1}{5}$ of total length .... 2. *A. rictuosus*, p. 275.
D. 5/32. A. 31. Caudal fin $\frac{2}{9}$ of total length .... 6. *A. dentatus*, p. 278.

1065. (1.) Apocryptes serperaster. (Fig. 93.)

Apocryptes serperaster, *Richardson, Ich. China*, p. 206; *Day, Fish. India*, p. 300, pl. lxvi, fig. 2 (see synon.).

B. iv. D. 6 | 27. P. 21. V. 1/5. A. 27. C. 13. L. l. 65–70. L. tr. 20.

Length of head $6\frac{1}{2}$, of caudal fin 5, height of body 7 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and $\frac{1}{4}$ apart. Lower jaw slightly the longer. Cleft of mouth oblique, maxilla reaching to below hind edge of eye Greatest width of head equals its height, and its height its length behind the eye. *Teeth*—an outer enlarged row of from four to eight directed downwards on either side of symphysis of upper jaw; a single row in lower jaw directed outwards, and a single canine or a pair internally above the symphysis. *Fins*—dorsal fins not continuous, the first twice as high as the second, spines weak and with filamentous terminations, last dorsal ray reaches to beyond commencement of caudal fin. Ventrals reaching as far as pectorals.

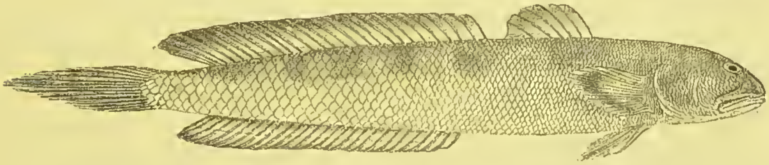

Fig. 93.—*Apocryptes serperaster.*

Anal slightly lower than second dorsal. Caudal lanceolate. *Scales*—wanting on interorbital space, snout, and jaws, small and irregular before origin of anal, behind this they are in regular rows, much larger in hinder portion of body, there being only six rows between last dorsal ray and base of anal fin. *Colour*—dull greenish along back, becoming dull white on sides and abdomen; five or six irregular bands pass from back halfway down the sides. A narrow grey band along the lower third of both dorsals, which are dark externally. Caudal grey, with a light yellowish outer edge. Pectoral grey, its upper and five lower rays yellowish white. Anal with a narrow grey band along the middle, its outer edge dark, and its last rays nearly black.

Hab. Seas and estuaries of India and China.

1066. (2.) Apocryptes rictuosus.

Apocryptes rictuosus, *Cuv. & Val. H. N. Poiss.* xii, p. 151; *Day, Fish. India*, p. 300 (see synon.).

B. iv. D. 6/24–27. P. 20. V. 1/5. A. 25–29. C. 13. L. l. ca. 75.

Length of head $7\frac{1}{2}$, of caudal fin 3, height of body 11 to 13 in the total length. *Eyes*—diameter 6 to 7 in length of head, about 1 diam. from end of snout, and $\frac{1}{3}$ apart. Width of head equals half its length and its height equals its length behind the eyes. Cleft of mouth deep, extending at least 1 diameter beyond the orbit. *Teeth*—from 20 to 28, pointed, in either ramus of lower jaw, the outermost recurved; a rather large number, also pointed, in upper jaw; a pair of small canines, internally, above mandibular symphysis. *Fins*—dorsals continuous at their bases, spines of first dorsal with filamentous prolongations, but not much higher than second; last dorsal ray extends to base of caudal. Pectoral of equal length with ventral. Caudal pointed and very elongate. *Scales*—in irregular rows, very small anterior to dorsal fin, becoming larger posteriorly. *Colour*—greyish, lighter towards the abdomen, with badly defined oblique bands passing downwards and forwards from base of dorsal fin halfway to abdomen. Ventral whitish. Pectoral, anal, first and second dorsal whitish, externally stained with grey, sometimes spotted with brown; usually a black spot surrounded by a yellow ring on the last few dorsal rays. The inside of the mouth with black spots.

Hab. Seas and estuaries of India, attaining 7 inches in length.

1067. (3.) Apocryptes bleekeri.

Apocryptes bleekeri, *Day, Fish. India*, p. 300, pl. lxiv, fig. 3 (see synon.).

B.iv. D.6/22–25. P.19. V.1/5. A.22–23. C.13. L. l. 55–60. L. tr. 13.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 5 to $5\frac{1}{2}$, height of body 7 to 8 in the total length. *Eyes*—diameter 5 to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart; interorbital space concave. Greatest width of head equals half its length and its height equals its length behind the eyes. Snout somewhat compressed, cleft of mouth nearly horizontal; maxilla reaches about one or two diameters of orbit behind posterior edge of eye. *Teeth*—25 to 30 teeth, notched at their extremities, in anterior half of lower jaw on either side; 15 or 20 pointed ones on either side of the premaxillaries, extending further backwards than in the mandibles and not placed so closely together. *Fins*—first dorsal higher than second, and from $\frac{2}{3}$ height of body to equally high, the membrane of first dorsal extends to second, which fin is higher than the anal. Ventral reaches nearly halfway to the anal. Caudal pointed. *Scales*—cycloid and arranged in regular rows, largest in the posterior portion of the body, they extend on to the head. *Colour*—greyish or olive-brown, with five light brown spots along the sides, usually forming bands over the back; numerous fine dots over the head and body. Pectoral deep olive or nearly black, with a white lower edge. First dorsal mostly with a dark mark in its upper fourth between its third and fifth spines. Second dorsal and caudal with some rows of fine dots. Ventrals white.

Variety. Without scales on the head, an ocellus at end of soft dorsal, and last third of anal with a grey band along its base.

Hab. Seas of India to the Malay Archipelago, attaining at least 4 inches in length.

1068. (4.) Apocryptes batoides.

Apocryptes batoides, *Day, Fish. India,* p. 301, pl. lxvi, fig. 3.

B. iv. D. 6 | 23. P. 21. V. 1/5. A. 23. C. 13.

Length of head $6\frac{1}{3}$, of caudal fin $3\frac{2}{3}$, height of body 12 in the total length. *Eyes*—high up, diameter $6\frac{1}{2}$ in length of head, 2 diam. from end of snout, and $\frac{3}{4}$ apart. Greatest width of head equals its height or $\frac{1}{2}$ its length. Cleft of mouth nearly horizontal. *Teeth*—eight or ten pointed ones on either side of both jaws, none are notched, all are of a brown colour, two moderately sized posterior canines in the lower jaw. *Fins*—the two dorsals of about the same height, equal to that of the body. Ventral reaches halfway to the anal. Caudal lanceolate. *Scales*—cycloid, large and small ones intermixed, becoming larger posteriorly, they extend on to the head. *Colour*—greyish along the back, becoming whitish below; fins without marks.

Hab. Moulmein, where an example 10 inches long was obtained.

1069. (5.) Apocryptes lanceolatus.

Eleotris lanceolata, *Bl. Schn. Syst. Ich.* p. 67, t. 15.
Apocryptes lanceolatus, *Day, Fish. India,* p. 301, pl. lxiv, fig. 5 (see synon.).

Nullah ramah, Tel.; *Pitallu,* Ooriah; *Nga-yat,* Arracan; *Cheering,* Chittagong; *Nga-pyan,* Burm.

B. iv. D. 5 | 31–32. P. 21. V. 1/5. A. 29–30. C. 11.

Length of head 7 to $7\frac{1}{2}$, of caudal fin $4\frac{1}{2}$ to $6\frac{1}{2}$, height of body 7 to 9 in the total length. *Eyes*—diameter 6 to 7 in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Greatest width of head half or more than half its length, and its height $\frac{4}{5}$ of its length. Maxilla reaches to beneath middle or hind edge of orbit. *Teeth*—of moderate size in upper jaw, with blunt free extremities as if cut off, or else slightly swollen; those in lower jaw horizontal, occasionally the outer one is slightly recurved and a little enlarged; a pair of posterior canines above symphysis. *Fins*—the membrane of first dorsal fin scarcely reaches to second, the two fins of about the same height, equal to half that of the body. Ventral reaches about $\frac{1}{3}$ of the way to the anal. Caudal lanceolate. *Scales*—minute, becoming more distinct in the posterior portion of the body. *Colour*—dull greenish above, with numerous fine brown spots; usually many dark bands descend from the back towards

the abdomen; dorsals with several rows of fine spots; caudal barred in a few or many rows.

Hab. Seas of India to the Malay Archipelago; attaining at least 8 inches in length.

1070. (6.) **Apocryptes dentatus.**

Apocryptes dentatus, *Cuv. & Val. H. N. Poiss.* xii, p. 148; *Day, Fish. India,* p. 301 (see synon.).

B. iv. D. 5/32. A. 31. Vert. 12/15.

Length of head 8, of caudal fin 4½, height of body 14 in the total length. *Eyes*—diameter 6 in length of head, rather more than 1 diam. from end of snout, and ½ apart. Cleft of mouth horizontal and extending to behind the posterior margin of the orbit. *Teeth*—20 in each jaw, the central ten the largest, a pair of canines near the symphysis. *Fins*—dorsal low, the first connected by its membrane to the second. Caudal lanceolate. *Scales*—very small. *Colour*—olive or brownish, palest above; caudal reddish dotted with brown.

Hab. Coromandel coast of India.

1071. (7.) **Apocryptes bato.**

Gobius bato, *Ham. Buch. Fish. Ganges,* pp. 40, 365, pl. 37, fig. 10.
Apocryptes bato, *Day, Fish. India,* p. 302, pl. lxiv, fig. 6 (see synon.).

Rutta, Ooriah.

B. iv. D. 5 | 21–22. P. 23. V. 1/5. A. 23. C. 13.

Length of head 6 to 6½, of caudal fin 4⅔, height of body 7 in the total length. *Eyes*—rather high up, diameter 5½ to 6 in length of head, 1 to 1½ diam. from end of snout, and 1 apart. Interorbital space slightly concave. Greatest width of head equals its height or ⅔ of its length; cleft of mouth nearly horizontal; the maxilla reaches to below the first third or centre of the eye. *Teeth*—about 24 on either side of both jaws, all of which are notched at their extremities, those in the mandible horizontal; two moderately sized posterior canines in lower jaw. *Fins*—dorsal and anal fins of about the same height, and ⅔ of that of the body. Pectoral half as long as head, ventral reaches halfway to anal. Caudal lanceolate, most expanded in examples from Orissa. *Scales*—cycloid, large and small ones intermixed, becoming larger posteriorly, and extended on to the head. *Colour*—greenish white, with about twelve ill-defined narrow bands, descending from the back towards the abdomen; scales with brown points; fins white, but also with minute dots; a dark band at base of pectoral.

Hab. Orissa and Lower Bengal within tidal reach; attaining 6½ inches in length.

5. Genus APOCRYPTICHTHYS, Day.

Branchiostegals five. Gill-openings rather small. Body elongate. Teeth in a single fixed row in either jaw, those in the premaxillaries curved, pointed, elongate, and with a long canine on either side of the symphysis; those in the lower jaw subhorizontal, rather swollen at their free extremities, and without posterior canines. Two separate dorsal fins, the first with six flexible spines, the second elongate. Ventrals united, forming a disk, and only connected to the body by their bases. Caudal lanceolate. Scales cycloid, absent from the head, becoming larger posteriorly.

1072. (1.) Apocryptichthys cantoris. (Fig. 94.)

Apocryptes cantoris, *Day, P. Z. S.* 1870, p. 693.

Apocryptichthys cantoris, *Day, Fish. India*, p. 302, pl. xlii, fig. 7.

D. 6 | 27. P. 19. V. 1/5. A. 26. C. 17. L. l. ca. 90. L. tr. 17.

Length of head 4, of caudal fin 5, height of body 9 in the total length. *Eyes*—not prominent, diameter 6 in length of head, 1 diam. from end of snout, and $\frac{2}{3}$ apart. Head rather depressed, its lower surface flat; greatest width equals its height or $\frac{2}{5}$ of its

Fig. 94.—*Apocryptichthys cantoris.*

length. An angular pendulous flap of skin from the preorbital on side of upper jaw. *Fins*—the membrane of the first dorsal continued almost to the base of the second. Base of pectoral not muscular. *Colour*—greyish olive; first dorsal dark, longitudinally banded; caudal dark with some spots in its upper half.

Hab. Madras and Andamans.

6. Genus PERIOPHTHALMUS, Bl. Schn.

Mud-skippers.

Branchiostegals five; pseudobranchiæ rudimentary. Gill-openings rather narrow. Body elongate, subcylindrical anteriorly. Profile from eyes to snout very steep. Eyes placed close together, very prominent, and the eyelids well developed. Teeth in both jaws, erect, conical, fixed, and in one or two rows. Two dorsal fins, the first with a varying number of flexible spines; base of pectoral muscular; ventrals more or less united in their lower two thirds; caudal with its inferior edge obliquely truncated. Air-bladder absent. Scales small or of moderate size, cycloid or feebly ctenoid, covering the body and the base of the pectoral fins.

Geographical Distribution. Coasts and estuaries round Indo-Pacific Ocean, also West Africa.

These fishes, from the muscular development at the base of the pectoral fins, are able to use them for progression on mud or for climbing. It is most curious to see *P. schlosseri* along the side of the Burmese rivers; at a distance the fishes appear like large tadpoles, stationary, contemplating all passing objects, or else snapping at flies or insects; suddenly startled by something, away they go with a hop, skip, and a jump, either inland among the trees, or on to the water like a flat stone or a piece of slate sent skimming by a schoolboy. They climb on to trees and large pieces of grass, leaves, and sticks, holding on by their pectoral fins exactly as if these were arms. Now and then they plant these firmly as organs of support, the same as one places one's elbows on a table, then they raise their heads and take a deliberate survey of surrounding objects.

Synopsis of Indian Species.

L. l. 75. Brown with white or blue dots .... 1. *P. koelreuteri*, p. 280.
L. l. 55. Brownish with emerald-green spots.. 2. *P. schlosseri*, p. 281.

1073. (1.) **Periophthalmus koelreuteri.** (Fig. 95.)

Gobius koelreuteri, *Pall. Spic.* viii, p. 8, t. ii, figs. 1, 2, 3.
Periophthalmus koelreuteri, *Day, Fish. India*, p. 303, pl. lxiv, fig. 8 (see synon.).

Chood-mud-dah, Andam.

D. 10–15 | 12–13. P. 15. V. 1/5. A. 11–14. C. 11. L. l. 75.

Length of head 4 to $4\frac{2}{3}$, of caudal fin $4\frac{3}{4}$, height of body 7 in the total length. *Eyes*—elevated and close together, diameter 4 in length of head, and 1 diameter from end of snout. *Teeth*—about 24 conical, pointed ones in each jaw. *Fins*—the first dorsal fin is much more elevated in some specimens than in others, being

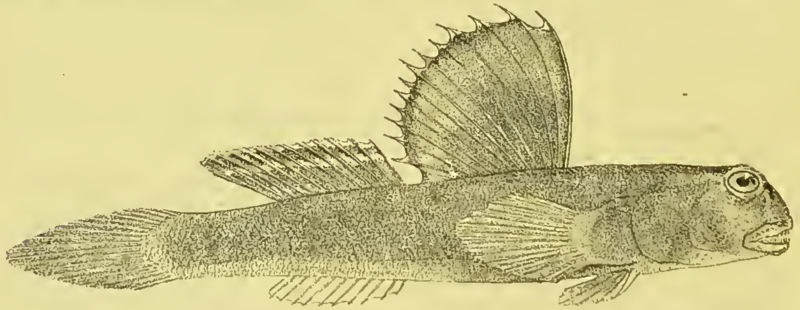

Fig. 95.—*Periophthalmus koelreuteri.*

shortest in the immature. Ventrals short. *Colour*—head sometimes with blue spots. Body olive-brown, with white or blue dots: first dorsal bluish with a dark edge, a white tip, and occasionally white spots at its base; second dorsal generally with a black, white-edged longitudinal band in its upper half or upper third, lowest

portion with white dots. Peetoral and caudal often with brown dots.

Hab. Red Sea, seas and coasts of India, aseending estuaries and tidal rivers, also found at the Andamans, in the Malay Arehipelago, and Pacifie islands.

1074. (2.) Periophthalmus schlosseri.

Gobius schlosseri, *Pall. Spic.* viii, p. 3, t. 1, figs. 1–4.
Periophthalmus schlosseri, *Day, Fish. India,* p. 304, pl. lxvi, fig. 4 (see synon.).

D. 0–15 | 1/12. P. 9. V. 1/5. A. 1/12. C. 12. L. l. 55. L. tr. 11/12.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 5 to 6, height of body 5 to 6 in the total length. *Eyes*—high up, diameter $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diameters from end of snout, and $\frac{1}{4}$ of a diameter apart. *Teeth*—front six in premaxillaries the longest. *Fins*—the first dorsal fin may be entirely absent, composed of very short spines, or of moderate development, or the anterior spine elongate in the males. Ventrals united in their basal third or free. *Colour*—when alive, brownish banded with emerald-green spots, most distinct on the head, but in eertain lights all over the body. First dorsal blaek, becoming bluish above, and edged with white, a scarlet band along the middle with a white dot between eaeh ray. Seeond dorsal the same, but the base lighter and spotted; anal edged with white. In the *male* the first dorsal fin has a black band, beeoming eobalt externally and with a searlet edging.

Hab. Coasts and large tidal rivers of Bengal, Burma, Andamans, the Malay Arehipelago and beyond; attaining at least 9 inches in length.

7. Genus BOLEOPHTHALMUS, Cuv. & Val.

Branehiostegals five; pseudobranchiæ; a slit behind the fourth gill. Gill-openings narrow. Body subcylindrical; head oblong. Eyes very prominent, situated close together, the outer eyelids well developed. Cleft of mouth nearly horizontal, the upper jaw sometimes slightly the longer. Teeth in a single row, the anterior in the upper jaw enlarged and stronger than the others; those in the lower jaw in a single horizontal row, of about equal size and having a pair of posterior canines near the symphysis. Two dorsal fins, the anterior with five flexible spines; the second with many rays equalling or exceeding those in the anal; pectoral with its basal portion museular and generally free; ventrals more or less united; caudal with its inferior edge obliquely truncated. Air-bladder present or absent. Seales when present rudimentary or small, generally largest posteriorly.

Geographical Distribution. Coasts of tropical Indo-Pacific, aseending tidal rivers.

It should be remarked that although the eyes are very promi-

nent during life, this peculiarity is not so well seen after death. These fishes are essentially dwellers in the mud, and if placed in an aquarium in deep water appear to be rapidly drowned.

Synopsis of Indian Species.

A. Height of body contained about 10 times in total length.
  Second dorsal not united to caudal fin . . 1. *B. tenuis*, p. 282.
  Second dorsal connected by membrane with caudal . . . . 5. *B. viridis*, p. 285.
B. Height of body $7\frac{1}{2}$ to 9 times in total length.
  a. Two dorsals not connected together by membrane.
    First dorsal not higher than body . . . . . . 2. *B. dussumieri*, p. 283.
    First dorsal much higher than body . . . . 4. *B. glaucus*, p. 284.
  b. Two dorsals connected by membrane . . 3. *B. dentatus*, p. 283.
C. Height of body 5 to 6 in total length.
  Body and dorsals spotted with blue, vertical bands on sides . . . . 6. *B. boddaerti*, p. 285.
  No spots on body or fins, vertical bands on sides . . . . 7. *B. sculptus*, p. 286.
  No vertical bands, body with greenish, dorsal with blue spots . . . . 8. *B. pectinirostris*, p. 286.

1075. (1.) Boleophthalmus tenuis.

Boleophthalmus tenuis, *Day, Fish. India*, p. 305, pl. lxv, fig. 1.

D. 5 | 28–29. P. 13. V. 1/5. A. 26. C. 13.

Length of head $5\frac{1}{3}$ to $6\frac{1}{4}$, of caudal fin $4\frac{1}{5}$ to $4\frac{3}{4}$, height of body 10 in the total length. *Eyes*—situated close together, diameter 6 in length of head, 1 diameter from end of snout. Upper jaw the longer, snout rounded in both directions, skin loose but without any angular flap. Eight or ten short barbels along lower edge of each ramus of lower jaw, but no central barbels under symphysis. *Teeth*—from 7 to 9 large, pointed canines on each side of the middle of the upper jaw, outside them are about 10 more one third of their size, and also pointed; those in the lower jaw are compressed, subhorizontal, pointed, and about 17 on each side, two moderately sized posterior canines above symphysis. *Fins*—first dorsal about $\frac{1}{3}$ higher than second, and about as high as the body, the interspace between the two fins in a large specimen equals height of first dorsal; second dorsal reaches nearly to base of caudal, which is lanceolate. Anal not so high as second dorsal. *Scales*—absent. *Colour*—Greyish above, white below; numerous black spots on upper surface of head and commencement of body, which latter has cloudy marks and bands from the second dorsal fin. First dorsal black above and with some dark bands below; second dorsal with about nine or ten oblique black bands in its lower two thirds continued on to the body, posteriorly its upper edge white with a black margin, as is also upper edge of caudal. Pectoral and ven-

tral grey, anal white; caudal blackish with white spots, each having a black centre.

Hab. Estuaries near Karáchi. Largest specimen obtained $6\frac{1}{4}$ inches in length. This species is common in Sind, but does not appear to extend so far east as Bombay.

1076. (2.) Boleophthalmus dussumieri.

Boleophthalmus dussumieri, *Cuv. & Val. H. N. Poiss.* xii, p. 207, pl. 354; *Day, Fish. India*, p. 305, pl. lxiv, fig. 9 (see synon.).

Nivti, Maráthi.

D. 5 | 27–28. P. 19. V. 1/5. A. 26. C.13. L. l. ca. 125.

Length of head $5\frac{1}{3}$, of caudal fin $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $7\frac{3}{4}$ to 8 in total length. *Eyes*—rather prominent, diameter 7 in length of head, 1 diameter from end of snout, and $\frac{1}{3}$ apart. *Barbels*—absent. *Teeth*—three on each side of the middle of the upper jaw, pointed, and directed downwards; about 25 small, conically-shaped along either branch of upper jaw. *Fins*—first dorsal nearly or quite as high as body, its base slightly longer than its height, it does not extend to the second dorsal; dorsal rays about half as high as spines and equal throughout. Ventrals extending half-way to the vent; anal commencing under the fourth dorsal ray, its posterior rays slightly the longest and about half as high as those of the second dorsal; caudal pointed. *Scales*—distinct on the body, but somewhat indistinct on the head. *Colour*—grey, first dorsal purplish, covered with round black spots; the second with two or three rows of oblong white spots; caudal black.

Hab. Bombay and coast of Sind, growing to 6 inches in length.

1077. (3.) Boleophthalmus dentatus. (Fig. 96.)

Boleophthalmus dentatus, *Cuv. & Val. H. N. Poiss.* xii, p. 208, pl. 355; *Day, Fish. India*, p. 306, pl. lxiv, fig. 10.

D. 5 | 27. P. 19. V. 1/5. A. 26–27. C. 15.

Length of head 5 to $5\frac{1}{2}$, of caudal fin 4 to $4\frac{1}{2}$, height of body $7\frac{1}{2}$ to $8\frac{1}{2}$ in the total length. *Eyes*—rather prominent, diameter 7 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $\frac{1}{2}$ or less apart. *Ba bels*—absent. *Teeth*—three on either side of the middle of the upper jaw, elongate, about 25 conical ones along either branch of the upper jaw; 35 to 40 teeth on either branch of the lower jaw, with their summits tricuspidate or else with a slight lobe on the outer side. *Fins*—first dorsal one-fourth higher than body below it, its rays extend beyond the membrane, which last extends to base of second dorsal; rays about half as high as spines of first dorsal, and equal throughout; ventrals not extending halfway to the vent; anal commencing under fourth ray of second dorsal, posterior rays a little the longest and rather above half the height of those of second dorsal. *Scales*—only distinct in a narrow

band on the abdomen, along either side of the anal fin, some along the sides below the second dorsal fin, and a few towards the head, elsewhere they look like rough points. *Air-bladder*—small, but present. *Colour*—olive-grey, with dull vertical bands on body,

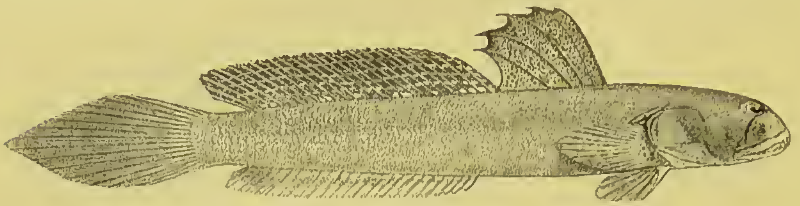

Fig. 96.—*Boleophthalmus dentatus.*

First dorsal purplish, covered with black spots with whitish edges, upper margin of fin yellowish; second dorsal with about five rows of oblong white spots, and some black ones having white edges along the first half of its base. Upper margin of the caudal with a white band and yellow spots between its black rays.

Hab. Bombay and Kurrachee; growing to 7½ inches in length.

1078. (4.) Boleophthalmus glaucus.

Boleophthalmus glaucus, *Day, Fish. India*, p. 306, pl. lxv, fig. 3.

D. 5 | 27. P. 19. V. 1/5. A. 25. C. 13.

Length of head 5 to 5½, of caudal fin 4⅓, height of body 8 to 9 in the total length. *Eyes*—prominent, situated close together at the summit of the head, diameter 5 in length of head, 1¼ diam. from end of snout. A few short tentacles along lower edge of mandibles, none below the symphysis. *Teeth*—13 large, pointed, canine-like in front of upper jaw, the outer on either side a little enlarged and recurved, laterally there are 13 more teeth as large as those in the mandibles. *Fins*—first dorsal elevated, its height from $\frac{1}{5}$ to $\frac{1}{6}$ the total length, second dorsal about $\frac{2}{3}$ height of body. Caudal lanceolate. *Scales*—minute, but visible in last half of body. *Colour*—greenish, tinged with violet along abdomen, cloudy bands on head, a few widely scattered black spots on the cheeks and upper fourth of body. Second dorsal with dark horizontal lines, most distinct posteriorly. Pectoral grey, with a yellowish outer edge. Anal yellowish. Caudal light in its lower third, whilst superiorly it is dotted or covered with white spots surrounded by a black ring.

Hab. Andamans; it, along with *Periophthalmus koelreuteri* and other allied forms, frequents in hundreds large mud-flats, but is most difficult to capture, as it dives down into the semifluid mud on the slightest sign of danger. It is said that crows and birds of prey never trouble themselves to pursue these fishes, as to catch them is an almost hopeless task.

1079. (5.) Boleophthalmus viridis.

Gobius viridis, *Ham. Buch. Fish. Ganges*, pp. 42, 366, pl. 32, fig. 12.
Boleophthalmus viridis, *Day, Fish. India*, p. 307, pl. lxvi, fig. 5 (see synon.).

D. 5 | 26. P. 21. V. 1/5. A. 26. C. 15.

Length of head $5\frac{1}{2}$, of caudal fin $4\frac{1}{3}$, height of body 10 in the total length. *Eyes*—very protuberant, close together, diameter 6 in length of head, and $1\frac{1}{4}$ diam. from end of snout. A few short tentacles along lower edge of each ramus of lower jaw, and a larger one under the symphysis. *Teeth*—14 large, pointed, canine-like ones in front of the upper jaw, the outer of which is the largest but not recurved. *Fins*—first dorsal from two to three times as high as the body, and with a very narrow base; second dorsal low, a membranous connection between its last ray and the base of the caudal. Caudal lanceolate. *Scales*—microscopic. *Colour*—greenish, becoming white beneath. Some black spots rather widely separated upon head, body, and dorsal fins; caudal with its upper two thirds having dark angular bands, its lower third white. In two specimens in the British Museum there are some narrow, vertical, dark bands on the sides.

Hab. Estuaries and coasts of Bengal to the Malay Archipelago and beyond.

1080. (6.) Boleophthalmus boddaerti.

Gobius boddaerti, *Pall. Spic.* viii, p. 11, pl. 2, figs. 4, 5.
Boleophthalmus boddaerti, *Day, Fish. India*, p. 307, pl. lxv, fig. 2 (see synon.).

Nettee kunla mottah, Tel.; *Khavla nivta*, Marát.

D. 5 | 24–25. P. 17. V. 1/5. A. 24. C. 13. L. l. 70. L. tr. 19–21.

Length of head $4\frac{1}{4}$ to 5, of caudal fin 5 to 6, height of body 5 to 6 in the total length. *Eyes*—high up, projecting, diameter from 6 to 7 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $\frac{1}{4}$ apart. *Barbels*—absent. *Teeth*—the six central ones in the premaxillaries are canines pointing downwards. In the lower jaw the teeth are horizontal, about 30 on either ramus, truncated at their summits, whilst some have a slight lobe on either side. *Scales*—cycloid, scarcely, if at all, imbricate on the head although extended all over it, on each scale on the head and anterior portion of the body is a rough elevation, sometimes pitted in the centre, and as the fish becomes older it appears as if in place of scales its anterior portion were covered with small rough elevations; eight rows between posterior terminations of dorsal and anal fins. *Air-bladder*—present, but small. *Colour*—greenish blue, with seven or eight vertical black bands; body covered with opaque blue spots; first dorsal likewise blue-spotted, and three rows on the second, with four large series along its base. Pectoral orange with a black edge,

or dark with an orange margin; anal and caudal blackish; ventral purplish.

Hab. Coasts and estuaries of India and Burma to the Malay Archipelago. I have not taken this fish west of Bombay, it being replaced in Sind by *B. tenuis, dussumieri*, and *dentatus*. Burmese specimens have usually a black edge to the pectoral fin.

1081. (7.) Boleophthalmus sculptus.

Boleophthalmus sculptus, *Günther, Catal.* iii, p. 104; *Day, Fish. India*, p. 308.

D. 5 | 25. P. 15. V. 1/5. A. 24. C. 15. L. tr. 12.

Length of head $4\frac{1}{2}$, of caudal fin $5\frac{1}{4}$, height of body 6 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and close together. *Teeth*—six large, vertical, pointed teeth in front of premaxillaries, those in the lower jaw truncated at their summits, some having a slight lobe on either side. *Fins*—third dorsal spine with a filamentous prolongation. Pectoral rather short. Caudal truncated. *Scales*—cycloid, those on the head and anterior portion of the body rudimentary, with flat, rounded tubercles, each having a depression in its centre. In the last portion of the body they become more distinct. *Colour*—"greenish olive, yellowish on the belly; six rather distinct darker bands descend obliquely from the back towards the belly; the anterior dorsal greyish, the other fins reddish."—*Günther, l. c.*

Hab. India, whence one specimen was brought by General Hardwicke: I have received one from Bombay.

1082. (8.) Boleophthalmus pectinirostris.

Gobius pectinirostris, *Gmel. Syst. Nat.* i. p. 1200.
Boleophthalmus pectinirostris, *Day, Fish. India*, p. 308 (see synon.).

D. 5 | 23–24. P. 18. V. 1/5. A. 23–24. C. 14. Vert. 11/14.

Length of head $4\frac{3}{4}$, of caudal fin 5, height of body 6 in the total length. *Eyes*—approximating, diameter 4 to 5 in length of head, $\frac{2}{3}$ diam. from end of snout. *Teeth*—three large, pointed teeth on either side of the middle of the upper jaw, in lower jaw 36 to 40 truncated and notched teeth along either ramus. *Fins*—spines of first dorsal filamentary, and extending some distance beyond the membrane, their height being nearly twice that of the body; last dorsal rays $\frac{3}{4}$ height of body; ventrals reach halfway to the anal. Caudal pointed. *Scales*—cycloid, anteriorly rudimentary, those in the posterior portion of the body are more developed, but in irregular rows, there being about 17 between posterior extremities of the second dorsal and anal fins. *Colour*—the body with small, dark tubercles, and verdigris spots. Vertically placed blue spots on first dorsal, and six or seven transverse ones on the second, where they

sometimes form bands; some also on the caudal; the other fins brownish.

Hab. Coast of Burma to the Malay Archipelago and beyond.

Second group. ELEOTRINA.

8. Genus **BOSTRICHTHYS** (Lacép.), C. Duméril.

Syn. *Bostrychus*, Lacép.; *Philypnus*, Val.; *Bostrictis* and *Ictiopogon*, Raf.; *Philypnodon*, Bleeker; *Lembus*, Günther.

Branchiostegals four to six; pseudobranchiæ. Gill-opening of moderate width. Body subcylindrical anteriorly; head somewhat depressed. Eyes lateral, of moderate size, not prominent. Teeth in the jaws in many rows without canines, present on vomer, present or absent on palate and tongue. Two dorsal fins, the anterior with 6 or 7 spines. Base of pectoral slightly muscular; ventrals placed close together but not united. Scales of moderate or small size.

1083. (1.) **Bostrichthys sinensis.** (Fig. 97.)

Bostrychus sinensis, *Lacép. H. N. Poiss.* iii, p. 141.
Bostrichthys sinensis, *Day, Fish. India,* p. 309, pl. lxv, fig. 4 (see synon.).

Lee-mee-jo-do-dah, Andam.

B.v. D.6 | 1/10–12. P.15. V.1/5. A.1/9. C.13. L.l.140. Vert.12/15.

Length of head from $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body $7\frac{1}{2}$ to 8 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. Greatest width of head equals its length excluding the snout. Anterior nostril tubular and long. *Fins*—first dorsal not so high as second. *Scales*—cycloid, rudimentary

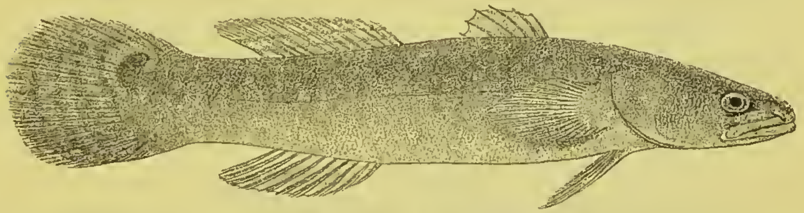

Fig. 97.—*Bostrichthys sinensis.*

on top of head and nape; small on the cheeks, larger on the opercles. On the body they are irregular. *Colour*—dark brown marbled, a black white-edged ocellus at upper part of root of caudal; three bands formed of spots along dorsal, caudal also vertically banded by spots.

Hab. Andamans to the Malay Archipelago and China. At the Andamans this fish is not uncommon in the brackish waters, where it feeds on small crustacea.

9. Genus **ELEOTRIS**, Gronovius.

Syn. *Asterropteryx*, Rüppell.

Branchiostegals from four to six, occasionally terminating anteriorly in a spine; pseudobranchiæ present. Gill-openings of moderate width. Body subcylindrical; head oblong. Eyes lateral, not prominent, and of moderate size. Teeth small, none on vomer or palatines. Two dorsal fins, the anterior with few (5–8) spines, and these sometimes filamentous; base of pectoral slightly muscular; ventrals placed close together but not united. Scales present. Air-bladder large. Anal papilla distinct. Pyloric appendages generally absent.

Geographical Distribution. These fishes are generally found in the seas of the tropics, mostly along the shores, in estuaries, or tidal rivers, but not above tidal influence. The only one I have observed that appears to live in fresh as well as brackish or salt water is *E. fusca*, which, though most numerous near the coast, is still found a hundred miles and more from the sea.

Synopsis of Indian Species.

A. No serrated ridges on head; no preopercular spine.	
a. Scales of moderate size. L. l. less than 50; L. tr.* not exceeding 15.	
a'. Eyes 2 to 3 diameters apart.	
First dorsal with 7 spines. L. l. 30, L. tr. 13–14	1. *E. macrolepidota*, p. 289.
First dorsal with 6 spines. L. l. 36–37, L. tr. 13–14	2. *E. porocephalus*, p. 289.
First dorsal with 6 spines. L. l. 31–34, L. tr. 10–11............	8. *E. tumifrons*, p. 292.
b'. Eyes less than $1\frac{1}{2}$ diameters apart.	
D. 6 | 1/10, A. 11, L. l. 27, L. tr. 12.	6. *E. feliceps*, p. 291.
D. 6 | 1/8, A. 1/7, L. l. 42, L. tr. 15.	13. *E. scintillans*, p. 295.
D. 6 | 1/8, A. 1/7, L. l. 35, L. tr. 11.	14. *E. litoralis*, p. 295.
b. Scales small. L. l. more than 50; L. tr. exceeding 15.	
L. l. 80–100, L. tr. 30. Tail pointed. Longitudinal bands on body	3. *E. muralis*, p. 290.
L. l. 80, L. tr. 16. Tail rounded. Vertical bands on body	4. *E. ellioti*, p. 290.
L. l. 75–80. Head with dark-edged blue spots. Fins banded	5. *E. sexguttata*, p. 291.
L. l. 120, L. tr. 30. Tail rounded	7. *E. macrodon*, p. 292.
L. l. 58, L. tr. 17. Fins banded. Body without bands	11. *E. canarensis*, p. 294.
B. No serrated ridges on head. A preopercular spine.	
L. tr. 17. Eyes 1 to $1\frac{1}{4}$ diam. apart. A deep depression over orbits ..	9. *E. cavifrons*, p. 293.

* Between origin of second dorsal and anal, see note p. 247.

L. tr. 16. Eyes $1\frac{1}{2}$ to 2 diam. apart. 10. *E. fusca*, p. 293.
L. tr. 12. Eyes $\frac{3}{4}$ diam. apart .... 12. *E. lutea*, p. 294.
C. Serrated ridges on head. A large spot at root of pectoral. L. tr. 9–10.
a. Interorbital space scuteless .... 15. *E. caperata*, p. 296.
b. Interorbital space with scales.
Height of body $5\frac{1}{3}$ to $5\frac{1}{2}$ in total length .... 16. *E. butis*, p. 296.
Height of body 7 in total length .. 17. *E. amboinensis*, p. 297.

1084. (1.) Eleotris macrolepidota.

Sciæna macrolepidota, *Bloch, Ich.* t. 298.
Eleotris macrolepidota, *Day, Fish. India*, p. 310, *Suppl.* p. 794 (see synon.).

B. vi. D. 7 | 1/8. P. 13. V. 1/5. A. 1/10. C. 16. L. l. 30. L. tr. 13–14.

Length of head, of caudal fin, and height of body each about 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and 3 apart. Height of head equals its length. Interorbital space swollen. Anterior nostril with a low valve. Cleft of mouth very oblique; the maxilla reaches to beneath the front edge of the orbit. *Teeth*—villiform. *Fins*—the second dorsal commences and terminates anteriorly to the corresponding parts of the anal. *Scales*—finely ctenoid on the body. *Colour*—brownish, with brown spots on the second dorsal; Bloch shows six vertical bands on the body, and spots on both dorsal, anal, and caudal fins.

Hab. The example purchased by Bloch was supposed to have come from India.

1085. (2.) Eleotris porocephalus. (Fig. 98.)

Eleotris porocephalus, *Cuv. & Val. H. N. Poiss.* xii, p. 237; *Day, Fish. India*, p. 312, pl. lxvii, fig. 1, *Suppl.* p. 795 (see synon.).

B. v. D. 6 | 1/9–10. P. 15. A. 1/7. C. 15. L. l. 36–37. L. tr. 13–14.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, of caudal fin 5 to 6, height of body $4\frac{3}{4}$

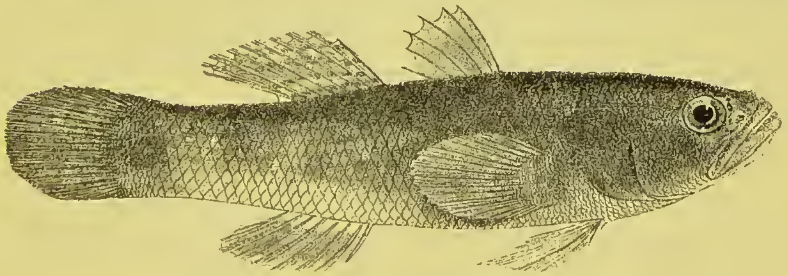

Fig. 98.—*Eleotris porocephalus.*

to $5\frac{1}{4}$ in the total length. *Eyes*—diameter from 4 to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 2 to $2\frac{1}{4}$ apart. Head

obtuse, flat, depressed. Greatest width of head equals its length excluding the snout, and its height equals its length behind the eye. Lower jaw the longer; the maxilla reaches to rather behind the centre of the eye. Anterior nostril tubular. *Fins*—the two dorsals of about equal height or two thirds that of the body, the last dorsal ray scarcely reaches the base of the caudal fin. Caudal rounded. *Scales*—ctenoid, extended over the head except on front portion of snout, those on upper surface of head small. *Colour*—deep blackish brown, marbled with darker; second dorsal with three or four rows of spots; a dark band along the anal. In some specimens there are numerous light spots upon the body and also on the second dorsal fin.

Hab. Andamans, Burma, to the Malay Archipelago; attaining to at least 8 inches in length.

1086. (3.) **Eleotris muralis.**

Eleotris muralis (*Quoy & Gaim.*), *Cuv. & Val. N. H. Poiss.* xii, p. 253, pl. 357; *Day, Fish. India*, p. 310, pl. lxix, fig. 1; *Suppl.* p. 794 (see synon.).

B. v. D. 6 | 1/12. P. 19. A. 1/12–20. C. 13. L. l. 80–100. L. tr. 30.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $6\frac{3}{4}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Greatest width of head equals its height or its length behind the middle of the eyes. Cleft of mouth oblique; the maxilla reaches to below the front edge of the orbit. *Teeth*—a single row of pointed, rather curved, and large teeth in the premaxillaries; an outer row of curved teeth in front of the lower jaw, ending laterally in one or two canines. *Fins*—dorsal spines with filamentous terminations, the third being half as high again as the body; the last dorsal ray as high as the body. Caudal pointed. *Scales*—none on head, those on body ctenoid. *Colour*—two or three longitudinal red bands along upper half of body, which may be broken up into spots, sometimes there are also a few vertical red bands crossing the horizontal rows at right angles; three or four red bands on the head, those on the opercle being tortuous. Several rows of red spots on the first dorsal fin forming bands, and a black blotch at its summit between third and fourth spines. Two or three red lines along the second dorsal, and one along the anal fin; caudal with red spots.

Hab. Seas of India to the Malay Archipelago.

1087. (4.) **Eleotris ellioti.**

Eleotris ellioti, *Day, P. Z. S.* 1888, p. 262, *and Fish. India, Suppl.* p. 794.

Cul nachooli, Tamil.

B. vi. D. 6/12. P. 21. V. 6. A. 13. C. 13. L. l. 80. L. tr. 16.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{2}{3}$, height of body $5\frac{1}{2}$ in the

total length. *Eyes*—high up, diameter 3½ in length of head, 1 diam. from end of snout. Height of head ⅔ of its length; interorbital space narrow. Cleft of mouth somewhat oblique; the maxilla extends posteriorly to beneath the middle of the eye. *Teeth*—rather large, a single row in upper jaw with two small lateral canines; two or three rows in middle of lower jaw, separated from the single lateral row by two large recurved canines. *Fins*—dorsal spines thin, as high as body below them, second dorsal and anal one third lower than first dorsal. Caudal rounded, with its central rays somewhat the longest. *Scales*—ctenoid in posterior portion of the body, and larger than in the anterior portion, small on surface of head; none on the cheeks. *Colour*—whitish, with five wide and light chestnut bands descending from the back, each with a black outer edge; another over the nape without dark edges. Caudal fin brown, with a broad yellowish black-bordered vertical band down its middle. A dark horizontal band running along the cheeks below the eye. Dorsal fins light brown with white edges, a large black white-edged blotch in posterior half of first dorsal, and a second but smaller one at termination of second, the latter white at its base.

Hab. Madras. A skin from Sir W. Elliot's collection is 3·2 inches in length, but it is in bad condition. A coloured drawing was made when the fish was fresh.

1088. (5.) **Eleotris sexguttata.**

Eleotris sexguttata, *Cuv. & Val. H. N. Poiss.* xii, p. 254; *Day, Fish. India*, p. 311 (see synon.).

B. iv–v. D. 6 | 1/12. P. 21. V. 1/5. A. 1/12. L. l. 75–80.

Height of body 7 to 8 in the total length. *Eyes*—not one diameter apart. *Teeth*—in a single row of unequal size. *Fins*—dorsal spines, from the second to the fourth inclusive, produced into filaments. *Colour*—greenish, shot with rosy; blue spots with dark edges on the sides of the head; occasionally a violet spot before the dorsal fin, which latter has a black upper margin; second dorsal with six longitudinal violet stripes, anal with two; caudal with pearl-coloured ocelli edged with violet.

Hab. Ceylon to the Malay Archipelago.

1089. (6.) **Eleotris feliceps.**

Eleotris feliceps, *Blyth, J. A. S. B.* xxix, 1860, p. 146; *Day, Fish. India*, p. 311 (see synon.).

B. v. D. 6 | 1/10. P. 15. V. 1/5. A. 11. C. 13. L. l. 27. L. tr. 12.

Length of head 4, of caudal fin 5, height of body 5 in the total length. *Eyes*—close together, 1 diameter from end of snout. Head slightly depressed, snout pointed. Lower jaw the longer. Cleft of mouth short; the maxilla only extends halfway to below

the orbit. *Fins*—dorsal spines filiform: central caudal rays the longest. *Scales*—cycloid as far as base of anal, where they become strongly ctenoid; anteriorly they reach to the posterior margin of the orbit, and also cover the cheeks and opercles. *Colour*—brownish white, irregularly spotted and blotched darker; dark bands pass downwards from the orbit; fins more or less spotted.

Hab. Andamans, whence the Calcutta Museum received one specimen $1\frac{1}{2}$ inches in length.

1090. (7.) Eleotris macrodon.

Eleotris macrodon, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng. en Hind.* p. 104, t. 2, fig. 1; *Day, Fish. India,* p. 311, pl. lxv, fig. 5 (see synon.).

B. v. D. 6 | 1/9. P. 17. A. 1/8. C. 13. L. l. 120. L. tr. 30.

Length of head $4\frac{1}{4}$, of caudal fin 6, height of body 6 in the total length. *Eyes*—diameter $6\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 2 apart. Upper surface of head flattened, snout slightly elevated. Greatest width of head equals length behind eyes, and height equals half length. Lower jaw the longer. Cleft of mouth oblique, the maxilla reaching to below the centre of the orbit. No spine on preopercle. Anterior nostril tubular. A small barbel is said to exist on each side of the upper jaw. *Teeth*—several villiform rows in both jaws, an outer row of enlarged conical teeth in front of premaxillaries, two being large canines; in the lower jaw from four to six conical canines anteriorly, whilst the inner villiform row is very slightly the larger. *Fins*—dorsal of about equal height and half that of body. Caudal rounded. *Scales*—cycloid, in irregular rows over body and head, except at front of snout and lower jaw; posterior half of caudal scaled. *Colour*—brownish, second dorsal with several brown spots. A dark ocellus edged with light at upper part of base of caudal fin.

Hab. Estuaries and mouths of large rivers in Lower Bengal and Burma; attaining at least $4\frac{1}{2}$ inches in length.

1091. (8.) Eleotris tumifrons.

Eleotris tumifrons, *Cuv. & Val. H. N. Poiss.* xii, p. 241; *Day, Fish. India, Suppl.* p. 795 (see synon.).
Eleotris ophiocephalus (*Cuv. & Val.*), *Day, Fish. India,* p. 312, pl. lxvii, fig. 2.

A-rig-dah and *Mu-took-dah,* Andam.

D. 6 | 1/8–9. A. 1/7–8. C. 15. L. l. 31–34. L. tr. 10–11. Cæc. pyl. 2.

Length of head $3\frac{3}{4}$ to $4\frac{1}{3}$, of caudal fin $5\frac{1}{2}$ to 6, height of body 4 to 5 in the total length. *Eyes*—diameter 5 to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 2 to 3 apart. Width of head equalling its length without the snout, its height a little less. Lower jaw the longer, cleft oblique; the maxilla reaches to below the front edge of the orbit. Anterior nostril tubular. *Teeth*—in

numerous villiform rows in both jaws. *Fins*—first dorsal spines rather fine, about half the height of body; last dorsal rays prolonged, reaching to nearly or quite the base of the caudal fin. Caudal rounded. *Scales*—finely ctenoid, reaching snout, also covering cheeks and opercles; those on top of head as large as those on body. *Colour*—olive-brown, some irregular blotches along the sides, and three black bands radiate from the eye; sometimes a light ocellus edged dark at upper half of base of pectoral fin; vertical fins with light margins; a darkish band along second dorsal, anal, and ventral fins; soft dorsal sometimes with two narrow darkish bands.

Hab. Andamans, the coast of Africa, and Malay Archipelago; growing to at least $9\frac{1}{2}$ inches in length.

1092. (9.) Eleotris cavifrons.

Eleotris cavifrons, *Blyth, J. A. S. B.* xxix, 1860, p. 145; *Day, Fish. India,* p. 313, pl. lxv, fig. 6.

B. v. D. 6 | 1/8. P. 13. A. 1/8. C. 15. L. l. 65. L. tr. 17.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, of caudal fin 5 to $5\frac{1}{4}$, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to 6 in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Head depressed; its greatest width equals its length excluding the snout, and its height equals half its length. A deep depression exists over the orbits. Lower jaw the longer, cleft of mouth oblique; the maxilla reaches to below the hind edge of the orbit. A well-marked spine pointing downwards at angle of preopercle. Anterior nostril somewhat tubular. *Teeth*—villiform in both jaws. Four or five large canine-like teeth in front of lower jaw, inner row also enlarged, terminating laterally in a canine-like tooth. *Fins*—first dorsal not quite so high as the second, the last rays of which equal height of body; ventral extends halfway to anal. Caudal obtusely rounded. *Scales*—cycloid and small anteriorly, ctenoid on the body, they extend forwards to the snout and over the opercle and subopercle, but there are none on the cheeks, which, however, have little rows of warts. *Colour*—light brown, with dark bands radiating from orbits; a few dark spots on the body; dorsals and caudal with spots forming bars.

Hab. Andamans; growing to 4 inches in length.

1093. (10.) Eleotris fusca.

Pœcilia fusca, *Bl. Schn. Syst. Ich.* p. 453.
Eleotris fusca, *Günther, Catal.* iii, p. 125; *Day, Fish. India,* p. 313, pl. lxv, fig. 7 (see synon.).

Poollan, Mal.; *Bundi balah kera,* Ooriah; *Mussoorie,* Tamil.

B. vi. D. 6 | 1/8. A. 1/8. C. 12. L. l. 60–65. L. tr. 16. Vert. 11/14.

Length of head 4, of caudal fin $5\frac{3}{4}$ to 6, height of body 5 to 6 in the total length. *Eyes*—diameter 6 to 7 in length of head, 1 to

$1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. Head depressed, its width slightly exceeding height and equalling length excluding snout. Lower jaw rather the longer; the maxilla reaches to below the middle of the orbit. Angle of preopercle armed with a short spine directed downwards and forwards. *Teeth*—in many villiform rows. *Fins*—first dorsal spines weak, more than half as high as body, but $\frac{1}{4}$ less than rays of second dorsal. Caudal wedge-shaped. *Scales*—cover the body and head about as far forward as the snout, the opercles, and cheeks; those on the body are ctenoid. *Colour*—leaden black, lighter on abdomen, which sometimes has a yellow tinge; horizontal bars on dorsal fins, sometimes vertical on caudal. Occasionally the upper surface is light stone-colour. The markings and colours are subject to great variation.

Hab. Coasts of India to the Malay Archipelago, also the African coast, &c.; ascending rivers and growing to 8 inches in length.

1094. (11.) Eleotris canarensis.

Eleotris canarensis, *Day, Fish. India,* p. 313, pl. lxix, fig. 2.

B. vi. D. 6 | 1/8. P. 16. V. 1/5. A. 1/7. C. 15. L. l. 58. L. tr. 17.

Length of head $3\frac{3}{4}$, of caudal fin $6\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and nearly 1 apart. Greatest width of head equals its length behind the middle of the eye, and its height equals half its length. Upper surface of head flat; snout elevated. Lower jaw the longer; cleft of mouth very oblique; the maxilla reaches to below the middle of the orbit. Interorbital space flat. *Teeth*—in numerous villiform rows, very small, and equal. *Fins*—first dorsal spines weak, not produced, two thirds height of body, and nearly as long as posterior rays of second dorsal. *Scales*—strongly ctenoid behind the head, those on upper surface of head are nearly as large as those on body; they extend forwards to the snout, and cover the cheeks and opercles. *Colour*—dark brown, mottled with black; pectoral yellow, with several black bands of spots; first dorsal black, with a white band along its lower third; second dorsal with six or seven bands of spots; anal with bands of spots; caudal reticulated with black spots, and having a black band at its base: ventral spotted.

Hab. Mangalore, where a specimen was obtained.

1095. (12.) Eleotris lutea.

Eleotris lutea, *Day, Fish. India,* p. 314.

B. vi. D. 6 | 1/8. P. 15. V. 1/5. A. 1/8. C. 15. L. l. 50. L. tr. 12.

Length of head $3\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body 4 in the total length. *Eyes*—diameter 4 in length of head, $\frac{3}{4}$ diam. from end of snout and apart. Width of head equals length behind eyes, and height about the same. Upper surface of head and interorbital

space flattened; snout slightly elevated. Lower jaw the longer; cleft of mouth oblique; maxilla reaches to below middle of orbit. Anterior nostril tubular. A spine directed downwards at angle of preopercle. *Teeth*—in numerous villiform rows. *Fins*—first dorsal spines with filamentous terminations extending a short distance beyond the membrane, height equals half that of body; second dorsal highest anteriorly, $\frac{2}{3}$ that of body. Caudal wedge-shaped. *Scales*—ctenoid on the body, superiorly they do not extend so far forwards as the eye, whilst there are none on sides of head. *Colour*—dirty greyish, with vertical bands most distinct in posterior half of body; many dark spots on head; dorsals and anal with bands of black spots; caudal nearly black, and slightly reticulated.

Hab. Andamans.

1096. (13.) Eleotris scintillans.

Eleotris scintillans, *Blyth, J. A. S. B.* xxix, 1860, p. 146; *Day, Fish. India*, p. 314, pl. lxv, fig. 8.

B. v. D. 6 | 1/8. P. 15. V. 1/5. A. 1/7. C. 13. L. l. 42. L. tr. 15.

Length of head $3\frac{3}{4}$, of caudal fin $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and also apart. Head rather obtuse, flattened superiorly, its greatest width equals its height or its length behind the eyes. Lower jaw the longer. Cleft of mouth oblique; the maxilla reaches to below the middle of the orbit. Anterior nostril in a short tube. No spine on preopercle. *Fins*—first dorsal fin about half height of body, separated by only a short distance from second dorsal, the posterior rays of which reach to the base of the caudal, and equal $\frac{4}{5}$ height of body. Caudal rounded. *Scales*—on body and head excluding front of snout and lower jaw, they are ctenoid except on the head. *Colour*—brownish, marbled with darker, and the scales shot with light spots when in a certain position. Both dorsals with about three rows of spots, and a dark edge having a light margin. Anal with a dark band in its outer half having a light edge. Caudal dark, with a white edge, sometimes it and the anal are spotted; a dark ocellus at upper part of base of caudal fin.

Hab. Akyab and the Andamans.

1097. (14.) Eleotris litoralis.

Eleotris litoralis, *Day, Fish. India*, p. 314.

B. vi. D. 6 | 1/8. P. 15. V. 1/5. A. 1/7. C. 13. L. l. 35. L. tr. 11.

Length of head $3\frac{3}{4}$, of caudal fin 5, height of body 5 in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{3}$ apart. Greatest width of head equals its height or its length behind the eye. Upper surface of head nearly flat; snout slightly elevated. Lower jaw the longer; cleft of mouth rather oblique; the maxilla reaches to below the middle of the

eye. Anterior nostril tubular. *Teeth*—in numerous closely-set villiform rows in both jaws. *Fins*—spines of first dorsal weak, extending slightly beyond membrane, two thirds as high as the body and equal to posterior rays of second dorsal. Caudal wedge-shaped. *Scales*—ctenoid on the body, those on the upper surface of the head extend forwards to the snout; large scales on the cheeks and opercles. *Colour*—brownish, marbled with darker, fins rendered very dark by fine black dots, and three or four bars of spots on the dorsal spines and rays. Caudal blackish. Anal with a black band along its centre and an external white edge.

Hab. One specimen, a little over 3 inches in length, from the Andaman Islands.

1098. (15.) Eleotris caperata.

Eleotris caperatus, *Cantor, J. A. S. B.* xviii, p. 1179; *Catal.* p. 197.
Eleotris caperata, *Day, Fish. India*, p. 315 (see synon.).

Oo-suf-foo, Mugh.

B. v. D. 6 | 1/8. P. 21. V. 1/5. A. 1/8. C. 15. L. l. 30. L. tr. 9.

Length of head 4, of caudal fin $4\frac{1}{2}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Width of head equals height, or length behind middle of eyes. Snout rather elevated, with a slight transverse depression posterior to it; the maxilla reaches to below first third of eye. Supraorbital margin rather strongly serrated, likewise a serrated ridge along either side of posterior limb of premaxillary. *Fins*—first dorsal spines weak, and $\frac{3}{4}$ the height of the body; last rays of second dorsal equal to height of body. Caudal rounded. *Scales*—ctenoid, none on the interorbital space. *Colour*—leaden brown; fins blackish, especially the first dorsal; a deep black blotch, edged with scarlet, at the base of the pectoral fin; the second dorsal, caudal, and anal more or less spotted.

Hab. Coasts of India, the Andamans, to the Malay Archipelago, China, and beyond.

1099. (16.) Eleotris butis.

Cheilodipterus butis, *Ham. Buch. Fish. Ganges*, pp. 57, 367.
Eleotris butis, *Day, Fish. India*, p. 315, pl. lxvii, fig. 3 (see synon.).

Kullahray, Mal.

B. v. D. 6 | 1/8. P. 21. V. 1/5. A. 1/8. C. 13. L. l. 28. L. tr. 9–10.

Length of head 3 to $3\frac{1}{3}$, of caudal fin 6, height of body $5\frac{1}{3}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to 6 in length of head, $1\frac{3}{4}$ diam. from end of snout and also apart. Head broad and anteriorly depressed; width of head a little more than half its length, and its height slightly less. Lower jaw the longer; the maxilla reaches to below the middle of the eye. A finely serrated

ridge along the posterior and superior edges of the orbit, from which the ridge is divided by two rows of fine scales; serrated ridges also exist on either side of the snout, but all these serrations appear liable to variation, being usually most distinct in the young. *Fins*—first dorsal $\frac{2}{3}$ height of body, not so high as second, the posterior rays of which are $\frac{3}{4}$ height of body. Caudal cut rather square. *Scales*—ctenoid on the body, in large specimens there are generally about five or even more rudimentary ones at the base of each large one; they cover the head except the front of the snout and its under surface. Interorbital space nearly flat and covered with small scales. *Colour*—depends very much on locality, generally leaden or brownish, sometimes blotched with darker. A scarlet spot at base of pectoral fin, divided in centre by a round black mark. First dorsal nearly black; the second, the anal, and the caudal yellowish with bands of spots, upper edge of caudal sometimes reddish.

Hab. Seas and estuaries of India to the Malay Archipelago; attaining about 4 inches in length.

1100. (17.) Eleotris amboinensis.

Eleotris amboinensis, *Bleeker, Batavia Nat. Tijdsch.* v, p. 343; *Day, Fish. India,* p. 316 (see synon.).

Gugi-balah-kera, Ooriah.

B. v. D. 6 | 1/8. P. 19. V. 1/5. A. 1/8. C. 13. L. l. 28. L. tr. 9.

Length of head $3\frac{3}{4}$, of caudal fin 5 to $5\frac{1}{4}$, height of body 7 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile nearly horizontal, snout depressed. Greatest width of head equals length without snout, height equals nearly half its length. Lower jaw somewhat the longer; the maxilla reaches to nearly below the front edge of the eye. Upper and hind edge of orbit minutely serrated, also two serrated ridges along either side of the snout. *Teeth*—in numerous villiform rows in both jaws, the outer row in the premaxillaries larger, widely separated, and pointed, the inner row is rather horizontal; outer row in lower jaw anteriorly similar to that in the premaxillaries; the inner row laterally is enlarged. *Fins*—dorsal spines weak, about half the height of the body; anterior rays of second dorsal as high as the body and higher than the posterior ones. Caudal rounded. *Scales*—anteriorly extend forwards to snout, those in the interorbital space not being very small. A few scales on the body have each a rudimentary one at its base. *Colour*—brownish, sometimes vertically banded; first dorsal dark, second yellowish, with rows of brown spots on the rays; a large black spot surrounded by yellow at base of pectoral fin; anal and caudal brown-dotted, and having reddish margins.

Hab. Seas and estuaries of India to the Malay Archipelago.

Third group. AMBLYOPINA.

10. Genus GOBIOIDES, Lacépède.

Syn. ? *Tænioides*, Lacép.; *Amblyopus*, Cuv. & Val.; *Ognichodes* and *Psilosomus*, Swains.; *Odontamblyopus*, Bleeker.

Branchiostegals five; gills four; pseudobranchiæ absent. Body elongate; head oblong; no cavity above the opercles. Lower jaw prominent, causing the cleft of the mouth to be directed upwards. Eyes lateral, minute or indistinct. Teeth in a band, with a single anterior row in each jaw large, curved, conical, and distantly placed; a pair of posterior canines above the symphysis of the lower jaw may be present or absent. All vertical fins more or less confluent. The first portion of the dorsal fin, consisting of five undivided rays, is separated from the soft portion by an interval, in the middle of which is a single, sixth undivided ray. Second portion of dorsal and anal with many rays; ventrals united. Scales rudimentary or absent. Air-bladder, when present, small or large.

Geographical Distribution. Coasts, estuaries, and tidal rivers throughout India, the Malay Archipelago, China, and Japan. These fishes mostly delight in muddy localities and use their teeth very freely as organs of attack or defence.

Synopsis of Indian Species.

A. No posterior canines above mandibular symphysis; vertical fins densely enveloped in skin.
- Height of body $18\frac{1}{2}$ to 20 times in total length .... 1. *G. gracilis*, p. 298.
- Height $13\frac{1}{2}$ to 15 in total .... 3. *G. cæculus*, p. 299.
- Height 8 to $12\frac{1}{2}$ in total .... 4. *G. cirratus*, p. 300.

B. A pair of posterior canines above mandibular symphysis.
- *a.* Vertical fins densely enveloped in skin 2. *G. anguillaris*, p. 299.
- *b.* Vertical fins not enveloped in skin.
  - Height of body 12 to 14 in total. Tail bluntly pointed .... 5. *G. buchanani*, p. 300.
  - Height 12 in total. Tail lanceolate, acutely pointed .... 6. *G. rubicundus*, p. 301.
  - Height $20\frac{1}{2}$ in total. Tail lanceolate .. 7. *G. tenuis*, p. 301.

1101. (1.) Gobioides gracilis.

Amblyopus gracilis, *Cuv. & Val. H. N. Poiss.* xii, p. 166.
Gobioides gracilis, *Day, Fish. India*, p. 317 (see synon.).

D. 6 | 47–49. P. 17. V. 1/5. A. 47–49. C. 11.

Length of head $10\frac{1}{2}$ to 11, of caudal fin $10\frac{1}{2}$, height of body $18\frac{1}{2}$ to 20 times in the total length. *Eyes*—minute. Greatest width of head equals one third of its length and its height rather above half of its length. Lower jaw with several barbels on its anterior surface. *Teeth*—about ten almost vertical and large pointed teeth

in the outer row in either jaw, no posterior canines. *Fins*—densely enveloped in skin, dorsal and anal continuous with the caudal. Caudal pointed. *Scales*—absent. *Colour*—olive, with the fins, especially the caudal, rather darker.

Hab. Seas of India to the Malay Archipelago. This is not, I believe, a common species in India; my single specimen from Madras is 7 inches long.

1102. (2.) Gobioides anguillaris. (Fig. 99.)

Gobius anguillaris, *Linn. Syst. Nat.* i, p. 450.
Gobioides anguillaris, *Day, Fish. India*, p. 317, pl. lxvii, fig. 4 (see synon.).

Ahra ramah, Tel.; *Nga-nee-gley*, Burmese.

D. 6 | 45–47. P. 15. V. 1/5. A. 44–45. C. 13.

Length of head $7\frac{1}{2}$, of caudal fin 10 to $10\frac{1}{2}$, height of body 14 to 18 in the total length. *Eyes*—minute. Greatest width of head $\frac{2}{3}$ to $\frac{3}{5}$ of length, height $\frac{3}{4}$. A tubercle at symphysis of lower jaw, with a pair of short barbels, sometimes two more posteriorly. *Teeth*—of moderate size, about 16 large ones in the upper anterior row, and 14 in the lower jaw, a pair of posterior canines above symphysis

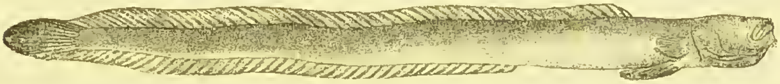

Fig. 99.—*Gobioides anguillaris.*

of lower jaw. *Fins*—dorsal enveloped in skin and not so high as the body; it is not separated from the caudal (as a rule) by any notch, but in some instances is half, in others entirely notched. Pectoral fleshy in its basal half, and not quite half so long as ventral. Anal usually not separated from caudal by a notch. Caudal rhomboidal. *Scales*—absent. *Colour*—pinkish, caudal darkest in its centre.

Hab. Seas of India to the Malay Archipelago and beyond.
The specimen figured (from Calcutta) is nearly 15 inches long.

1103. (3.) Gobioides cæculus.

Cepola cæcula, *Bl. Schn. Syst. Ich.* p. 241, t. 54.
Gobioides cæculus, *Day, Fish. India*, p. 318, pl. lxviii, fig. 1 (see synon.).

Gogee ramah, Tel.

D. 6 | 40–44. P. 15. V. 1/5. A. 38–45. C. 13.

Length of head 7 to $7\frac{1}{4}$, of caudal fin 10, height of body $13\frac{1}{2}$ to 15 in the total length. *Eyes*—high up, minute, in anterior third of head, and 5 diameters from end of snout. The greatest width of the head equals its height or $\frac{1}{2}$ its length. Lower jaw the longer, with some small barbels on it. *Teeth*—an outer row of more or

less curved teeth in either jaw, 16 to 18 in upper and 10 to 13 in lower jaw; no posterior canines in lower jaw. *Fins*—dorsal and anal only united to the caudal at their bases in some specimens, in half the height of the last rays in others; the fins enveloped in skin. Ventral as long as the head. Caudal short and pointed. *Scales*—absent. *Colours*—vary, those at Madras are mostly of a leaden hue, becoming light on the abdomen, vertical fins grey, central caudal rays black, pectorals and ventrals reddish; or the fish may be of a coppery colour along the back, shot with blue along the sides, fins reddish except the caudal, which is deep brown with reddish outer edges. Some are of a general reddish-brown colour.

Hab. Seas, estuaries, tidal rivers, and tanks along the coasts of India and the Andamans.

1104. (4.) Gobioides cirratus.

Amblyopus cirratus, *Blyth, J. A. S. B.* xxix, 1860, p. 147.
Gobioides cirratus, *Day, Fish. India,* p. 318, pl. lxix, fig. 4 (see synon.).

D. 6 | 43–47. P. 13. V. 1/5. A. 43–46. C. 13.

Length of head $7\frac{1}{4}$, of caudal fin 9, height of body 8 to $12\frac{1}{2}$ in the total length. *Eyes*—exceedingly minute, sometimes almost invisible. Greatest width of head $\frac{2}{3}$ of length, height slightly more. A pair of barbels under symphysis of lower jaw, and two more along either ramus. *Teeth*—much larger and more curved than in *G. anguillaris*, eight or ten in the upper and six or eight in the lower jaw; no posterior canines in lower jaw. *Fins*—dorsal and anal densely enveloped in skin and not quite so high as the body, each is separated from the caudal by a notch. Pectoral fleshy in its basal three fourths and not quite half as long as the ventrals, which latter are nearly as long as the head. Caudal rhomboidal. *Colour*—bright pinkish; caudal dark except its outer edges, which are pink.

Hab. Hooghly.

1105. (5.) Gobioides buchanani.

Amblyopus buchanani, *Day, P. Z. S.* 1873, p. 110.
Gobioides buchanani, *Day, Fish. India,* p. 318, pl. lxvii, fig. 5 (see synon.).

D. 6 | 42. P. 19. V. 1/5. A. 36. C. 17.

Length of head 7 to $7\frac{1}{2}$, of caudal fin 8, height of body 12 to 14 in the total length. *Eyes*—distinct. Greatest width of head equals its height, or half its length. A minute pair of barbels below the symphysis of the lower jaw, and a still smaller pair behind them. *Teeth*—a front row of eight large and curved teeth in either jaw; a pair of posterior canines above symphysis of lower jaw. *Fins*—vertical ones continuous, their posterior portions scarcely enveloped

in skin; caudal elongate and pointed. Pectoral not enveloped in skin, half as long as the ventrals. *Air-bladder*—large and oval. *Colour*—brownish olive above, reddish below. Pectoral and ventral yellow, with their outer halves black. Vertical fins blackish.

Hab. Calcutta, Lower Bengal, and along the coasts of the Bay of Bengal at least as low as Waltair; also Burma, certainly as far as Moulmein.

1106. (6.) Gobioides rubicundus.

Gobioides rubicundus, *Ham. Buch. Fish. Ganges*, pp. 37, 365, pl. 5, fig. 9; *Day, Fish. India*, p. 319, pl. lxvii, fig. 6 (see synon.).

D. 6 | 35–39. P. 30. V. 1/5. A. 33–36. C. 15.

Length of head $7\frac{1}{2}$ to 8, of caudal fin 5 to 6, height of body 12 in the total length. *Eyes*—high up, in the front third of the head, almost concealed. Greatest width of head equals half its length, and its height equals its length behind the eyes. *Barbels*—absent. *Teeth*—an outer row of about eight, long, curved, and pointed, in the premaxillaries, and of about twelve similar ones in the lower jaw; a pair of posterior canines above symphysis of lower jaw. *Fins*—dorsal and anal fins not enveloped in skin, the anal is often only connected to the caudal by its base. Dorsal fin about $\frac{1}{2}$ height of body. Caudal lanceolate. *Scales*—in the form of crypts on the head, minute ones begin to appear on the body in its last half, and become more distinct near the tail. *Colour*—greenish olive superiorly, becoming dull white below; vertical fins diaphanous; caudal black.

Hab. Seas of India and estuaries; very common in the Hooghly at Calcutta, where it attains at least 11 inches in length.

1107. (7.) Gobioides tenuis.

? Amblyopus roseus, *Cuv. & Val. H. N. Poiss.* xii, p. 164.
Gobioides tenuis, *Day, Fish. India*, p. 319, pl. lxix, fig. 3.

D. 6 | 33. P. 50. V. 1/5. A. 32. C. 17.

Length of head $8\frac{1}{3}$, of caudal fin $4\frac{1}{2}$, height of body $20\frac{1}{2}$ in the total length. *Eyes*—small but distinct, in the anterior third of the head. Greatest width of head equals its height and nearly half its length. Body very compressed. Lower jaw the longer, but not so distinctly forming the front of the head as in the other species. Some small barbels below symphysis of lower jaw. *Teeth*—outer row in each jaw containing about 12 curved canines, those in the lower jaw longer; two posterior canines above symphysis of lower jaw. *Fins*—vertical ones not enveloped in skin, the dorsal continuous with the caudal, rather higher than the body. Caudal lanceolate. *Colour*—general tinge roseate; fins colourless except the caudal, which is dark with a light outer edge.

Hab. Sind, where a specimen $7\frac{1}{4}$ inches long was captured.

11. Genus **TRYPAUCHEN**, Cuv. & Val.

Syn. *Ctenotrypauchen*, Steind.

Branchiostegals four; pseudobranchiæ. A deep blind cavity above the opercle, not in communication with that of the branchiæ. Body elongate and compressed; head likewise compressed. Eyes lateral, minute, not elevated. Teeth in a band; no canines. Dorsal fin single, the anterior portion consisting of six spines, the soft dorsal and anal with many rays, both are confluent with the caudal; ventrals with four or five rays, united, forming a disk. Scales small, cycloid.

1108. (1.) **Trypauchen vagina.** (Fig. 100.)

Gobius vagina, *Bl. Schn. Syst. Ich.* p. 73.
Trypauchen vagina, *Day, Fish. India*, p. 320, pl. lxviii, fig. 2 (see synon.).

Na-vettee, Tam.

D. 6 | 40–49. P. 15. A. 40–46. C. 13. L. r. 80–85. L. tr. 21.

Length of head 7 to 8, height of body $7\frac{1}{2}$ to 11 in the total length. *Eyes*—small, in the anterior fourth of the length of the head. Occipital crest elevated. *Fins*—first dorsal spine rather wide at its base, height of fin from $\frac{1}{2}$ to $\frac{4}{9}$ of that of body. Lower five pectoral rays short and unbranched. *Scales*—in rather irregular rows. *Colour*—white with a rosy tinge, much brighter at some seasons than at others; dorsal and anal with outer edges grey; caudal, pectoral, and ventral white, or tinged with yellow.

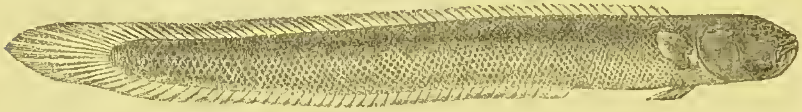

Fig. 100.—*Trypauchen vagina.*

Hab. Coasts of India through the Malay Archipelago to China. The specimen figured (from Calcutta) is $8\frac{3}{4}$ inches in length, and probably full-grown. A very common fish, eaten by the lower classes.

Family XXIX. CALLIONYMIDÆ.

Gill-openings of moderate width or very narrow. Body mostly elongate. The infraorbital ring of bones does not articulate with the preopercle. Teeth in the jaws, none on the palate. Two dorsal fins; second dorsal and anal similar; ventrals wide asunder. Scales and lateral line present or absent. Air-bladder absent.

1. Genus **CALLIONYMUS**, Linnæus.

Syn. *Synchiropus* and *Diplogrammus*, Gill.

Branchiostegals five or six; pseudobranchiæ; a slit behind the fourth gill. Gill-openings very narrow, sometimes merely a round hole at the upper edge of the opercle. Head and anterior portion of body depressed. Eyes of moderate size, usually directed somewhat upwards. Mouth narrow, upper jaw protractile. A strong, variously armed spine at the angle of the preopercle. Teeth in jaws minute. Two dorsal fins, the anterior consisting of three or four flexible spines; ventrals with five rays, widely separated one from the other. Lateral line single or double.

Geographical Distribution. These fishes, termed "Dragonets," live mostly at the bottom of the sea near the shore. They are found in the temperate seas of the Old World, and distributed throughout the seas of India and the Indo-Pacific region. They exhibit in many instances sexual distinctions either in length of fins or in colour, or in both.

Synopsis of Indian Species.

A. Gill opening small, superior.	
Height of body 12 times in total length	1. *C. longicaudatus*, p. 303.
Height of body 9 times in total length	2. *C. sagitta*, p. 304.
Height of body 7 times in total length	3. *C. fluviatilis*, p. 304.
B. Gill-opening dilated, lateral.	
a. First dorsal much higher than body.	
A. 7–8	4. *C. lineolatus*, p. 305.
A. 12	5. *C. orientalis*, p. 305.
b. First dorsal half height of body	6. *C. opercularis*, p. 306.

1109. (1.) Callionymus longicaudatus.

Callionymus longicaudatus, *Temm. & Schleg. Faun. Japon., Poiss.* p. 151, pl. lxxviii, figs. 1 & 2, and pl. lxxix A, fig. I; *Day, Fish. India*, p. 322 (see synon.).

B. v. D. 4 | 9. P. 20. V. 5. A. 9. C. 10.

Length of head $4\frac{1}{3}$ to 6, of caudal fin 2 to 3, height of body 12 in the total length. *Eyes*—close together, diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout. Preopercular spine straight, as long as diameter of eye, with five to ten denticulations internally, and one at its base pointing forward. Gill-opening small, on upper surface of head. Numerous rows of warts on the head. *Lateral line*—single. *Fins*—spines of first dorsal, in the *male*, filiform, extending some distance beyond the membrane, and about twice as high as the body; caudal very elongate. In the *female*, the first dorsal spines are short, caudal of moderate length. Caudal lanceolate. *Colour*—buff, with light rounded dots, occasionally having darker edges over the head and body. First dorsal greyish;

four rows of spots along the second dorsal; caudal banded in spots. Anal with a black white-edged band externally. Ventrals greyish.

Hab. East coast of Africa, Andamans, Malay Archipelago, China and beyond; attaining at least 13 inches in length.

1110. (2.) Callionymus sagitta.

Callionymus sagitta, *Pall. Spic.* viii, p. 29, t. 4, figs. 4, 5; *Day, Fish. India*, p. 322, pl. lxviii, fig. 5 (female) (see synon.).

B. v. D. 4 | 9. P. 15. V. 1/5. A. 9. C. 12.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, of caudal fin $5\frac{1}{3}$, height of body 9 in the total length. *Eyes*—diameter 5 to 7 in length of head, 1 diam. from end of snout, close together above. Head large, broad, and strongly depressed; occiput rugose. The maxilla scarcely reaches to below front edge of eye. Preopercular spine stout, as long as the eye, and armed with four or five large curved teeth directed inwards and slightly upwards, another at the base is directed forwards; the females have fewer teeth. Gill-openings small, on upper surface of head. *Fins*—first dorsal with its anterior rays elongate in the male, half as long as the body, in the female rather low. *Lateral line*—single. *Colour*—head and cheeks covered with small white-edged black dots; back greyish, covered with small ocellated spots; sometimes six or eight black blotches along middle of sides, abdomen whitish. Dorsal fins light grey, covered with ocelli, the first with a wide black edge in the female. Pectoral and ventral both spotted. Caudal with some black spots and whitish ocelli. Anal white in the male, with a black outer border.

Hab. Seas of India and Mauritius; attaining at least 4 inches in length.

1111. (3.) Callionymus fluviatilis.

Callionymus fluviatilis, *Day, Fish. India*, p. 322.

B. v. D. 4 | 10. P. 17. V. 1/5. A. 9. C. 11.

Length of head $3\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body 7 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart; the interorbital space rather concave. Head depressed; occiput rugose. Maxilla reaching to below first third of eye; lower jaw very narrow at apex. Preopercular spine strong, as long as orbit, armed internally with two or three curved teeth and one more pointing forward at its base. Gill-openings small, on upper surface of head. *Fins*—both dorsals low and of about equal height. *Lateral line*—single. *Colour*—greyish, upper portion of body grey ocellated with white, some brown spots along the upper side of the lateral line. First dorsal black, or only spotted, second with four or five rows of spots. Upper half of caudal spotted. Anal colourless.

Hab. Hooghly at Calcutta; growing to 3 inches in length.

1112. (4.) Callionymus lineolatus. (Fig. 101.)

Callionymus lineolatus, *Cuv. & Val. H. N. Poiss.* xii, p. 307; *Day, Fish. India*, p. 323, pl. lxviii, fig. 3 (see synon.).

B. v. D. 4/8. P. 15. V. 1/5. A. 7–8. C. 11.

Length of head $4\frac{1}{2}$ to 5, of caudal fin $4\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, nearly 1 diam. from end of snout, $\frac{1}{3}$ apart. Preopercular spine strong, as long as the orbit, having two teeth inside, and none directed forward at its base. Gill-openings almost covered by end of opercle, which is not produced. *Fins*—first dorsal (in the *male*) high, from $\frac{1}{3}$ to $\frac{2}{5}$ of the total length, the anterior spine the longest, all being weak, in the *female* this fin is $\frac{1}{3}$ less high than in the male; anterior rays of second dorsal shorter than posterior, all branched,

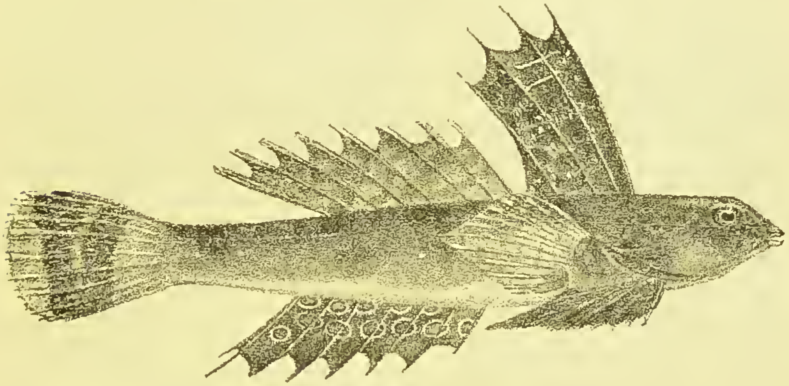

Fig. 101.—*Callionymus lineolatus.*

the last to its base; anal similar but shorter. *Lateral line*—single. *Colour*—five or six greyish bands across the back, continued down the sides; one more crosses the head. Mouth and lower surface of head scarlet. Three or four irregular transverse white spots with dark edges, also some round spots over upper half of first dorsal, in the female usually only round spots on first dorsal. Three oblique brown bands on ventral and caudal. Anal red, with a dark edge, and with two or three blue, white- or black-edged spots behind each ray.

Hab. Madras and Reunion, growing to about 4 inches in length.

1113. (5.) Callionymus orientalis.

Callionymus orientalis, *Bl. Schn. Syst. Ich.* p. 41, t. vi; *Day Fish India*, p. 323 (see synon.).

D. 4 (3?) | 10. P. 4? V. 7? A. 12. C. 8?

Preopercular spine short, with three teeth. *Fins*—first ray of anterior dorsal $\frac{1}{2}$ the total length, second but little shorter; second

dorsal and anal nearly double height of body; pectoral about $\frac{1}{4}$, and caudal more than $\frac{1}{5}$ of total length. *Colour*—orange, with black spots, and a few smaller white ones sparsely scattered amongst them. Dorsal and anal with round brown spots between their rays, also white points on the first of these fins; anal tinged with blackish, especially towards its margin; three brown or black bands across the pectoral, and five on the caudal; ventrals grey.

Hab. Tranquebar, growing to 6 inches in length.

1114. (6.) Callionymus opercularis.

Callionymus opercularis, *Cuv. & Val. H. N. Poiss.* xii, p. 305; *Day, Fish. India*, p. 323 (see synon.).

B. v. D. 4 | 9. P. 19. V. 1/5. A. 9. C. 11.

Length of head $3\frac{1}{2}$ to 4, of caudal fin 5 to $5\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter 5 in length of head, 1 to $1\frac{1}{2}$ diam. apart and from end of snout. Head wide and flat; two stellated sets of smooth ridges on the occiput. Preopercular spine strong, slightly curved, as long as the eye, and with six teeth internally, none pointing forwards at its base. Gill-opening oval, covered by produced extremity of opercle. *Teeth*—pointed, in several rows, the largest innermost. *Fins*—dorsal fin not produced, half as high as body, the second a little higher. *Lateral line*—single, those on the two sides meeting over the free portion of the tail. *Colour*—brownish anteriorly, dotted with points of a slightly darker colour. First dorsal brown, rays of second and those on upper border of pectoral and caudal fins with brown points on a pale ground-colour. Lower surface of body and anal whitish or pale grey. Ventrals blackish.

Hab. Coromandel coast of India, attaining at least 4 inches in length: said to be very common in the Arian-coupan river at Pondicherry from November to January, but very rare during remainder of year. I have taken it both at Pondicherry and Madras.

Family XXX. BLENNIIDÆ.

Pseudobranchiæ present. Gill-openings varying. Body elongate, more or less cylindrical. Teeth fixed in the jaws, or merely implanted in the gums. One, two, or three dorsal fins, occupying nearly the entire length of the back; in some the whole fin is composed of spines, whilst in others none are perceptible. Ventrals, when present, jugular (except in *Pseudoblennius*); they are sometimes rudimentary. Scales, when present, generally small. Air-bladder as a rule absent. Pyloric appendages absent.

Geographical Distribution. The fishes forming this family are found along the shores of most regions, some extend their range into brackish or even, it is said, into fresh water.

Synopsis of Indian Genera.

A. Caudal fin distinct.
  a. Gill-opening a small foramen above root of pectoral . . . . 1. PETROSCIRTES.
  b. Gill-opening wide
    a'. Dorsal single, with more rays than spines.
      No sucker below head . . . . 2. SALARIAS.
      A sucker below head . . . . 3. ANDAMIA.
    b'. Three dorsals . . . . 4. TRIPTERYGIUM.
    c'. Dorsal single, more spines than rays . . . . 5. ACANTHOCLINUS.
    d'. Two dorsals, anterior with three spines . . 6. CRISTICEPS.
B. Caudal continuous with vertical fins. Body band-like . . . . 7. XIPHASIA.

1. Genus PETROSCIRTES, Rüppell.

Syn. *Osmobranchus,* Ehrenb.; *Blennechis,* Cuv. & Val.; *Aspidontus,* Quoy & Gaim.

Branchiostegals six. Gill-openings reduced to a small foramen above the root of the pectoral fin. Body somewhat elongate. Snout short or of moderate length; cleft of mouth narrow; head sometimes with tentacles. A single row of fixed teeth in the jaws, with a strongly curved canine on each side, lower canines much larger than upper. Dorsal fin single or with a semi-detached portion; ventrals with two to four rays. No scales. Air-bladder present.

Geographical Distribution. Coasts of the Red Sea, India, the Malay Archipelago, and the Pacific.

Synopsis of Indian Species.

A. Dorsal continuous, nearly the same height throughout.
  D. 40, A. 27. Vertical bands on sides . . . . 1. *P. striatus,* p. 307.
  D. 34, A. 22–23. Spots and narrow horizontal lines on sides . . . . 2. *P. punctatus,* p. 308.
  D. 33, A. 23. Blue lines on head, two spots on dorsal . . . . 3. *P. bipunctatus,* p. 308.
  D. 28–31, A. 17–21.
    Head $5\frac{1}{4}$, height 6 in total length . . . . 4. *P. variabilis,* p. 309.
    Head $4\frac{1}{4}$, height $4\frac{1}{4}$ in total; white bands along side . . . . 6. *P. cyprinoides,* p. 310.
    Head $4\frac{1}{4}$, height $5\frac{1}{2}$ in total; a black band along side . . . . 7. *P. breviceps,* p. 310.
B. First 3 dorsal rays higher than rest, and separated by a notch . . . . 5. *P. lienardi,* p. 309.

1115. (1.) Petroscirtes striatus.

Petroscirtes striatus, *Day, P. Z. S.* 1888, p. 262; *Fish. India, Suppl.* p. 796.

D. 40. P. 13. V. 3. A. 27. C. 10.

Length of head $4\frac{3}{4}$, of caudal fin $6\frac{3}{4}$, height of body 6 in the

total length. *Eyes*—diameter $2\frac{2}{3}$ in length of head, $\frac{2}{3}$ diam. from end of snout and the same apart. Snout somewhat broad and rounded in front, the upper jaw a little the longer. *Teeth*—exceedingly large recurved canines in lower jaw, much smaller in upper; about 14 teeth in a single row in each jaw between the canines. *Fins*—dorsal commences midway between eye and hind edge of opercle, and does not extend quite so far as caudal fin, the height of its longest rays equals two thirds that of body and rather more than that of anal fin. *Colour*—about ten broad vertical bands extending from base of dorsal to anal, separated by very narrow light lines. Dorsal and anal externally black-edged, and the membrane studded with fine brown spots. Caudal light-coloured.

Hab. Ceylon, one specimen $1\frac{1}{2}$ inches in length.

1116. (2.) Petroscirtes punctatus.

Blennechis punctatus, *Cuv. & Val. H. N. Poiss.* xi, p. 286.
Petroscirtes punctatus, *Day, Fish. India*, p. 326 (see synon.).

D. 34. P. 12. V. 2. A. 22–23. C. 12.

Length of head $6\frac{1}{3}$, of caudal fin 8, height of body 6 in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout and also apart. Snout obtuse. *Teeth*—lower canines large, upper only half their size. *Fins*—dorsal just reaches to base of caudal, posteriorly it is $\frac{3}{4}$ the height of body; ventral short, not above half as long as pectoral. *Colour*—grey, with seven or eight pairs of spots on the body below base of dorsal, and four or five narrow, dark, horizontal lines along body; a dark line along dorsal fin becoming wider behind. In small specimens sometimes there are angular or irregularly directed narrow white bands.

Hab. Seas of India to Australia.

1117. (3.) Petroscirtes bipunctatus.

Petroscirtes bipunctatus, *Day, Fish. India*, p. 327, pl. lxxi, fig. 3.

D. 33. P. 13. V. 2. A. 23. C. 16.

Length of head 5, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, nearly 1 diam. from end of snout, and 1 apart. Profile of snout obliquely rounded. *Teeth*—twenty-four in upper and twenty-two in lower jaw, lower canines twice as long as upper. *Fins*—dorsal commences over hind edge of opercle, it does not extend to base of caudal. *Colour*—brownish grey, upper surface of anterior half of head and snout blue, narrow blue bands descend from middle of each eye and join on the throat; another from just behind each eye passes down parallel with the first, two more pass down from opercle to base of pectoral. Dorsal and anal fins edged with brown, two dark spots on dorsal.

Hab. The sea at Calicut.

1118. (4.) Petroscirtes variabilis. (Fig. 102.)

Petroscirtes variabilis, *Cantor, J. A. S. B.* xviii, p. 1182, *Catal.* p. 200; *Day, Fish. India,* pp. 327, pl. lxix, fig. 7, *Suppl.* p. 796 (see synon.).

D. 28–31. P. 13. V. 4. A. 17–21. C. 13.

Length of head $5\frac{1}{4}$, of caudal fin 6, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. Snout somewhat produced. A short simple tentacle at posterior upper edge of eye, and a very short one on either side of chin. *Teeth*—lower canines large, upper small. *Fins*—dorsal commences behind the preopercle, its greatest

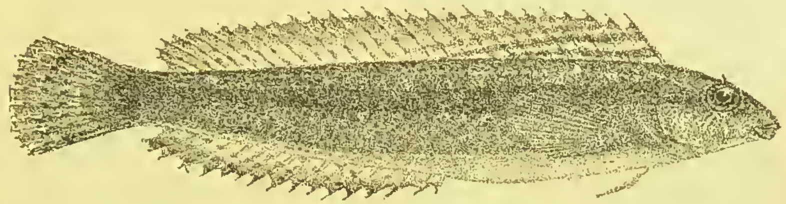

Fig. 102.—*Petroscirtes variabilis.*

height is $\frac{3}{4}$ that of body, it terminates a short distance before root of caudal fin. Caudal cut rather square, and said to sometimes have its upper or lower rays prolonged. *Colour*—pinkish, with dark spots, a broad bluish or blackish band from eye to base of caudal, where it ends in a large black blotch; a second dark band is sometimes present along the back at base of dorsal fin. Two or three blue bands pass downwards from the eye; head with numerous light spots. Dorsal and anal fins marbled and spotted in lines; caudal yellow, vertically banded in spots.

Hab. Calicut and the Nicobars; also found in the Malay Archipelago.

1119. (5.) Petroscirtes lienardi.

Petroscirtes lienardi, *Day, Fish. India,* p. 327, pl. lxix, fig. 8.

D. 3 | 10 | 17. P. 15. V. 3. A. 18–20. C. 11.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, of caudal fin 6 to $6\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, not 1 diam. from end of snout, and $\frac{1}{3}$ to $\frac{1}{2}$ apart. Interorbital space concave. Snout rather obtuse. A short fringed supraorbital tentacle and a small one at the nostril; several below symphysis of lower jaw, and some on cheeks and opercles. *Teeth*—25 in lower jaw, 28 in upper. *Fins*—first three dorsal rays $\frac{3}{4}$ height of body and separated by a deep cleft from remainder; the next ten rays much lower, projecting beyond the membrane and separated by a notch from the remaining 17 of the fin, which are about $\frac{3}{4}$ height of body and are not continued posteriorly to the caudal. Caudal rounded, *Colour*—light brown stone, vertically banded and

marbled with dark brown or groy. Dorsal fin light brown, marbled and spotted darker, the upper two thirds of the first portion nearly black, and some blaek marks near its base. Caudal yellow, with dark spots. Anal with oblique rows of spots and a dark outer edge. Two blaek spots at base of peetoral fin, whieh is yellow externally.

Hab. Sind, found in pools left by a reeeding tide.

1120. (6.) Petroscirtes cyprinoides.

Blennechis cyprinoides, *Cuv. & Val. H. N. Poiss.* xi, p. 286.
Petroscirtes cyprinoides, *Day, Fish. India,* p. 328 (see synon.).

D. 30. P. 15. V. 3. A. 20. C. 11.

Length of head $4\frac{1}{4}$, of eaudal fin $6\frac{3}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diameter from end of snout, and $\frac{1}{4}$ of a diameter apart. Some irregularly placed open pores on the head. *Fins*—dorsal eommenees over hind edge of operele and does not extend quite so far as the eaudal. Ventral rather short. Caudal nearly cut square. *Colour*—a white band along side, another below base of dorsal fin; a rather dark band along base of dorsal, and one or two rows of brown spots above it. A brownspot at base of peetoral; anal brownish, with two or three rows of dark spots; eaudal yellowish white. Seven vertieal bands said to exist along upper half of baek, extending on to caudal fin.

Hab. Seas of India to China.

1121. (7.) Petroscirtes breviceps.

Blennechis breviceps, *Cuv. & Val. H. N. Poiss.* xi, p. 283.
Petroscirtes breviceps, *Day, Fish. India,* p. 328 (see synon.).

D. 30. P. 16. A. 19. C. 11.

Length of head $4\frac{1}{4}$, of caudal fin 8, height of body $5\frac{1}{2}$ ($4\frac{2}{3}$) in the total length. *Eyes*—diameter $3\frac{2}{3}$ in the length of head, 1 diameter from end of snout and apart. Profile of snout oblique; interorbital space slightly coneave. A small supraorbital tentacle present in the type specimen. *Fins*—dorsal anteriorly $\frac{2}{3}$ as high as body, it commences above the gill-opening, and reaches almost to base of eaudal, membrane rather deeply emarginate. *Colour*—a black band along head and side of body; dorsal fin dotted with black; caudal yellowish.

Hab. Bay of Bengal.

2. Genus SALARIAS, Cuv.

Syn. *Alticus,* Comm.; *Rupiscartes,* Swains.; *Entomacrodus,* Gill.

Branehiostegals six. Gill-openings wide. Mouth transverse, rather wide; generally a tentacle above the orbit, espeeially in

males. A row of small movable teeth in the gums, and often a posterior curved canine in the lower jaw; palate almost invariably edontulous. Dorsal fin single; a notch in some species between the spinous and rayed portions; ventrals with one spine and two or three rays; fin-rays simple except those of the caudal, which are usually but not invariably branched. Scales absent. Air-bladder absent.

In some species the dorsal fin is more distinctly notched in the immature than in the mature. A crest on the head often shows the specimen to be a male, and in these the dorsal fin is sometimes comparatively higher than in females. The presence or absence of an orbital tentacle has been considered a sexual distinction.

Synopsis of Indian Species.

A. Dorsal fin not distinctly notched.
  a. A crest on the head. Dorsal twice height of body .... 1. *S. tridactylus*, [p. 312.
  b. No crest on head.
    a'. Dorsal not continued on to caudal fin.
      No tentacles on head .... 2. *S. sindensis*, p. 312.
      Supraorbital, nasal, and nuchal tentacles.. 3. *S. fasciatus*, p. 313.
    b'. Dorsal continued on to caudal fin.
      D. 30, A. 20. Supraorbital tentacles simple .... 4. *S. fuscus*, p. 313.
      D. 26 (13/13), A. 17. Supraorbital tentacles bifurcated .... 5. *S. cruentipinnis*, [p. 314.
B. Dorsal fin distinctly notched.
  a. Height of body but little less than $\frac{1}{3}$ total length .... 6. *S. brevis*, p. 314.
  b. Height of body less than $\frac{1}{4}$ total length.
    a'. A row of fringed tentacles along top of head .... 7. *S. steindachneri*, [p. 314.
    b'. A longitudinal crest on head (sometimes in males only).
      a''. D. 17/20–23, A. 28–29. Caudal rays undivided .... 8. *S. kirkii*, p. 315.
      b''. D. 14/22, A. 28. Caudal rays undivided .... 9. *S. andersonii*, [p. 315.
      c''. Dorsal spines not exceeding 13, anal rays not exceeding 25.
        a'''. Dorsal fin continued on to caudal.
          α. No canines.
            Horizontal or oblique light lines on dorsals and anal .... 10. *S. quadricornis*, [p. 316.
            Narrow oblique dark lines on dorsals, none on anal.......... 11. *S. lineatus*, p. 316.
            Lower half of dorsal with oblique, upper with longitudinal stripes.. 12. *S. hasseltii*, p. 317.
            Horizontal dark bands on first dorsal, oblique on second.......... 14. *S. dussumieri*, [p. 318.
          β. Small canines in lower jaw.
            Supraorbital tentacle fringed...... 17. *S. oortii*, p. 319.
            Supraorbital tentacle simple ...... 18. *S. bilitonensis*, [p. 319.

b'''. Dorsal fin not continued on to caudal.
a. Canines in lower jaw. [p. 317.
aa. Two dorsals of equal height .. 13. *S. andamanensis*,
bb. First dorsal lower than second. [p. 318.
Height of body $\frac{1}{7}$ total length .. 15. *S. periophthalmus*,
Height of body $\frac{2}{9}$ total length .. 19 *S. neilli*, p. 320.
Height of body $\frac{2}{11}$ total length.
Five or six horizontal black lines on sides, indistinct cross bands .... 16. *S. striolatus*, p. 319.
Eight pairs of vertical brown bands, and some white spots on sides................ .. 21. *S. alboguttatus*, [p. 321.
β. No canines .... 20. *S. unicolor*, p. 320.
c'. No crest. Canines present.
a''. Dorsal fin continued on to base of caudal.
Dorsal fins with oblique dark lines .... 22. *S. frenatus*, p. 322.
Dorsal fins reticulated................. 23. *S. vermiculatus*, [p. 322.
b''. Dorsal not continuous with caudal.
Brownish yellow with dark cloudy spots. 24. *S. marmoratus*, [p. 323.
Anterior half of body blue, posterior half orange .... 25. *S. bicolor*, p. 323.

1122. (1.) Salarias tridactylus.

Blennius tridactylus, *Bl. Schn. Syst. Ich.* p. 176.
Salarias tridactylus, *Day, Fish. India*, p. 330, pl. lxx, fig. 3 (see synon.).

D. 12–13 | 19–22. P. 13. V. 1/3. A. 25-26. C. 11.

Length of head $6\frac{1}{4}$, height of body $7\frac{1}{2}$ to $8\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{4}$ apart. Snout obtuse, overhanging the mouth. A well-developed crest on head; a small and simple tentacle over posterior upper angle of eye, none at nostril or neck. A row of four or five large open glands, having white edges, round posterior edge of orbit. *Teeth*—in jaws small; canines absent in my specimens (in Cuv. and Val. small ones are said to exist). *Fins*—dorsal not notched, double height of body, the spinous and rayed portions of nearly the same height, the membrane emarginate; the fin does not extend quite to the caudal, which is rounded. Caudal rays unbranched. *Colour*—plumbeous, usually with vertical bands, fine black spots on the head and anterior portion of the body, and sometimes light spots on the body. Dorsal with oblique black and white streaks alternating, and a white outer edge. Caudal rays black with the membrane yellow. Anal with a grey base and a black white-edged outer margin.

Hab. Red Sea, seas of India to the Malay Archipelago.

1123. (2.) Salarias sindensis.

Salarias sindensis, *Day, P. Z. S.* 1888, p. 263; *Fish. India, Suppl.* 1888, p. 797.

D. 13/20. P. 14. V. 2. A. 23. C. 12.

Length of head 5, height of body 5 in the total length. *Eyes*—situated high up, diameter 4 in length of the head, 1 diam. from end of snout and also apart. Body strongly compressed, profile from above orbits to end of snout oblique. Maxilla reaches to beneath front edge of eye. No tentacles or crest on head. *Teeth*—large, well developed, posterior canines. *Fins*—dorsal not notched, higher posteriorly, longest rays half height of body; anal not quite so high as soft dorsal; caudal rays unbranched. Dorsal and anal fins not quite united to caudal. *Colour*—olivaceous, four wide brown bands on head, the three anterior encircle it; about twelve vertical bands on body, more or less distinct, but most so at base of dorsal fin. Dorsal fin with a dark mark along anterior two thirds; anal black-edged, each ray tipped with pure white.

Hab. Three specimens up to 2½ inches in length from Karáchi in Sind.

1124. (3.) Salarias fasciatus.

Blennius fasciatus, *Bloch, Ich.* ii, p. 111, t. 162, fig. 1.
Salarias fasciatus, *Day, Fish. India*, p. 330 (see synon.).

B. vi. D. 12 | 17–19. P. 17. V. 3. A. 19–21. C. 11.

Length of head 6 to 6½, of caudal fin 5½, height of body 5 in the total length. *Eyes*—diameter 4½ in length of head, 1 diam. from end of snout, and 1 apart. Anterior profile of snout nearly vertical. Maxilla reaches to below hind edge of eye. No crest. A short fringed supraorbital tentacle, a fringed nasal one, and one at the nape. *Teeth*—no canines. *Fins*—dorsal fin not notched, continued nearly to caudal. Front anal rays rather elongate and semi-detached. *Colour*—light brown, banded and spotted with yellow and blue, sometimes blue spots along base of dorsal. On the throat and chest are light-coloured bands and white spots.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond.

1125. (4.) Salarias fuscus.

Salarias fuscus, *Rüppell, N. W., Fische*, p. 135, t. 32, fig. 2; *Day, Fish. India*, p. 330, pl. lxx, fig. 2, *Suppl.* p. 797 (see synon.).

D. 30. P. 15. V. 2. A. 2/18–19. C. 11.

Length of head 4½, height of body 3½ to 4 times in the total ength. *Eyes*—high up, not quite 1 diam. from end of snout, and ⅔ diam. apart. Profile from eye to snout subvertical, sometimes even projecting over mouth. Maxilla reaches to below middle of eye. A short simple tentacle over eye. No crest. *Teeth*—no canines. *Fins*—dorsal fin not notched, highest posteriorly, where it does not quite equal height of body; in the specimen described (male ?) the last dorsal and anal rays are prolonged; dorsal con-

tinued on to base of caudal, which is rather pointed. *Colour*—brown, dorsal and anal fins nearly black; pectoral yellow, with a black mark at base; caudal brownish.

Hab. From the Red Sea to the Malay Archipelago.

1126. (5.) Salarias cruentipinnis.

Salarias cruentipinnis, *Tickell, MSS.*; *Day, Fish. India, Suppl.* 1888, p. 797.

B. vi. D. 13/13. V. 2. A. 17.

Length of head 5, height of body 4 in the total length. *Eyes*—high up. Body compressed; profile from eyes to mouth almost vertical; maxilla reaches to beneath hind edge of eye. No crest; a bifurcated supraorbital tentacle and a fringed nasal one. *Fins*—dorsal not notched, continued on to caudal fin, spinous portion three fourths height of body and rather longer than soft portion. Anal lower than dorsal, posterior rays longest. *Colour*—rich vinous olive-sepia; a large patch of pale yellowish brown from angle of lips to lower edge of subopercle. Caudal fin of same colour as body, with the three outer rays above and below tawny. Dorsal fin dusky, its basal half blackish, external half of anterior 17 rays carmine, of posterior 9 rays black. Anal fin dusky with a carmine band along middle, and externally with a carmine and black edging. Pectoral paler than body, lower rays tinged carmine.

Hab. Saddle Island, off Kyoukhpyoo in Arracan. The specimen was 2·8 inches in length.

1127. (6.) Salarias brevis.

Salarias brevis, *Kner, Sitzb. Wien. Akad.* lviii, 1868, p. 334, t. vi, fig. 18.
Salarias leopardus, *Day, P. Z. S.* 1869, p. 518.
Blennius leopardus, *Day, Fish. India*, p. 325, pl. lxviii, fig. 6; *Suppl.* p. 796.

D. 12 | 12. P. 15. V. 4. A. (2+) 13. C. 11.

Length of head $3\frac{1}{2}$, height of body not quite 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout obtuse, not overhanging mouth. No crest. A transverse row of tentacles across occiput; a fringed supraorbital tentacle half length of eye; lips fringed, with two bifid tentacles on either side of symphysis of lower jaw. *Fins*—a deep notch between the two portions of dorsal fin; second dorsal not continued quite to caudal, which is cut square. Pectoral with outer half of its eight lower rays free; two fleshy prominences anterior to anal fin. *Colour*—rich brown, becoming whitish on the chest, and spotted all over with black, leaving narrow interspaces of ground-colour; fins unspotted.

Hab. Galle, Ceylon (*Dr. J. Anderson*), also the Sandwich Islands.

1128. (7.) Salarias steindachneri.

Blennius steindachneri, *Day, P. Z. S.* 1873, p. 110; *and Fish. India*, p. 326, pl. lxx, fig. 1, *Suppl.* p. 796.

D. 11–12 | 15–16. P. 14. V. 3. A. (2+) 16–18. C. 11.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $4\frac{1}{2}$ to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Snout obtuse, not overhanging mouth. No crest, but a line of eight or ten fringed tentacles from above eye to base of dorsal. A fringed orbital tentacle, another at nostril. *Teeth*—small posterior canines in lower jaw. *Fins*—first dorsal commencing over hind edge of preopercle, $\frac{3}{4}$ as high as body and rather higher than second dorsal, no distinct notch, but last spines rather lower than first rays, not continued on to caudal fin. First two anal rays in some specimens expanded and fringed at their extremities. Caudal cut square. *Colour*—light olive, with six indistinct vertical brownish bands, as wide as the ground-colour; the whole body and fins dotted with black; occasionally some white spots above anal. A large black, white-edged ocellus between first and second dorsal spines. Some vertical red bands on pectoral and caudal fins. Anal dark, with two rows of light blue spots on the anterior and three on the posterior rays, which have also small black dots and a narrow white edge. In some specimens all the dots are black.

Hab. Karáchi, growing to 4 inches in length; common in pools left by the receding tides on the rocks of Oyster Island. There are two illustrations of this species amongst Sir Walter Elliot's drawings, the largest was captured at Waltair.

1129. (8.) Salarias kirkii.

Salarias kirkii, *Günther, A. M. N. H.* 1868, ser. 4, i, p. 458; *Day, Fish. India*, p. 331, pl. lxix, fig. 6.

D. 17 | 20–23. P. 15. V. 4. A. 28–29. C. 14.

Length of head $6\frac{1}{2}$, of caudal fin 6, height of body $7\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Profile from upper edge of eyes to end of snout slightly oblique, some large open pores round eyes. A moderately well-developed crest on head, a short fringed tentacle over orbit. *Teeth*—no canines. *Fins*—dorsals divided by a slight notch; dorsal and caudal rays simple, not branched; second dorsal not continued quite to base of caudal. *Lateral line*—visible. *Colour*—dark leaden, with some traces of vertical bands; oblique lines on dorsal fins. Lower edge of anal white.

Hab. Zanzibar and Sind.

1130. (9.) Salarias andersonii.

Salarias andersonii, *Day, Fish. India*, p. 331.

D. 14 | 22. P. 15. V. 4. A. 28. C. 14.

Length of head 7, of caudal fin $5\frac{1}{2}$, height of body 7 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $\frac{1}{3}$ apart. Head rounded anteriorly, snout not projecting; some large open pores round eyes, also some smaller ones

about head and nape. A rounded and high crest on the head nearly ½ its height. A short fringed tentacle over orbit. *Teeth*—no canines. *Fins*—dorsals divided by a deep notch; the spines and rays scarcely project beyond membrane; first dorsal anteriorly rather higher than the body, second dorsal anteriorly three fourths height of body and rather less behind, it is not continued on to the caudal. Anal not so high as second dorsal. Caudal rays simple, not branched. *Lateral line*—distinct, ceasing opposite posterior end of second dorsal. *Colour*—dark brownish, without bands. Dorsal fins dark, with a few spots near posterior end of second dorsal, upper edge of fin white. Anal with a dark lower edge.

Hab. A fine specimen of this species was brought from Galle by Dr. J. Anderson.

1131. (10.) Salarias quadricornis.

Salarias quadricornis, *Cuv. & Val. H. N. Poiss.* xi, p. 329, pl. 329; *Day, Fish. India*, p. 331, pl. lxx, fig. 4 (male) (see synon.).

D. 13 | 20–22. P. 14. V. 2. A. 22–24. C. 13.

Length of head 5½ to 6, of caudal fin 6 to 6¼, height of body 5½ to 6 in the total length. *Eyes*—high up, about 1 diameter from end of snout, ½ apart; the profile before the eyes nearly vertical; interorbital space concave. The male has a low crest on the head, said to be wanting in female. A simple tentacle above eye; a fringed one at nostril, and a small one on nape. *Teeth*—no canines. *Fins*—first dorsal fin about half height of body, but not quite so high as second; a deep cleft in the membrane extending nearly to the base divides the two fins, second is continued on to caudal to ⅓ its length. Anal lower than dorsal, membrane deeply cleft. Caudal slightly rounded. *Colour*—varies exceedingly; body usually brownish, with eight or more vertical bands which reach to base of dorsal fin, sometimes there are brown dots. Dorsal fin with horizontal or oblique white bands, usually four in number. Anal with two or three horizontal white bands.

Hab. Red Sea, seas of India, Malay Archipelago, and China; attaining several inches in length.

1132. (11.) Salarias lineatus.

Salarias lineatus, *Cuv. & Val. H. N. Poiss.* xi, p. 314; *Day, Fish. India*, pp. 332, pl. lxx, fig. 8 (male), *Suppl.* p. 798 (see synon.).

D. 12 | 21–23. P. 14. V. 2. A. 23–24. C. 13.

Length of head 5¾ to 6½, of caudal fin 6½, height of body 6½ to 6¾ in the total length. *Eyes*—high up, in anterior third of head, ⅔ diam. apart; profile to snout subvertical. A tentacle with notched edges or fine lateral fringes above orbit, and a short fringed one at front nostril. A rather low crest, emarginate superiorly, on summit of head in males, absent in females. *Teeth*—canines absent. *Fins*—dorsal membrane deeply cleft, first fin two thirds height of

body, second rather higher and continued on to caudal. Pectoral as long as head excluding snout. *Colour*—leaden, in some specimens six to eight vertical bands on body as wide as ground-colour, eight to ten narrow horizontal black lines along body, decreasing in number to four or five and becoming more distinct towards the tail, sometimes they break up into spots; some specimens have narrow black vertical and sinuous lines on the cheek and below the eyes. Dorsal fins with numerous fine oblique black lines, passing upwards and backwards. Anal with a lightish base and a dark outer edge, in some specimens a narrow dark band along the middle. Caudal dark greyish.

Hab. Red Sea, seas of India to the Malay Archipelago.

1133. (12.) Salarias hasseltii.

Salarias hasseltii, *Bleeker*, *Batavia Nat. Tijdsch.* i, p. 257, and viii, p. 174; *Day, Fish. India,* p. 332 (see synon.).

D. 12 | 23. P. 14. V. 3. A. 24–25. C. 14.

Length of head $5\frac{3}{4}$, of caudal fin $6\frac{1}{2}$, height of body $7\frac{1}{4}$ in the total length. *Eyes*—of moderate size; profile to mouth vertical, but not prominent. A line of open glands along the hind and lower edge of the preopercle. A crest on head (? only in males); a short fringed supraorbital tentacle, another at nostril, none at nape. *Teeth*—no canines. *Fins*—dorsal deeply notched, and continuous with caudal; the two dorsal fins are of nearly the same height and about equal to that of body. *Colour*—stone-colour, with about six rather darker vertical cross bands and several light longitudinal stripes. Dorsal brownish, with oblique stripes in its lower half, its upper portion has four or five narrow bands parallel with its outer edge, and of a blue-brown and yellow colour. Anal with a dark outer edge.

Hab. I obtained one specimen, 3 inches long, at the Andamans. The range extends to the Malay Archipelago and Fiji Islands.

1134. (13.) Salarias andamanensis.

Salarias andamanensis, *Day, P. Z. S.* 1869, p. 611; *Fish. India,* p. 332.

D. 12. | 22. P. 15. V. 4. A. 22–24. C. 11.

Length of head 6, of caudal fin $5\frac{1}{2}$, height of body 5, of dorsal spines $8\frac{1}{2}$, of dorsal rays $8\frac{1}{2}$, of anal 11 in the total length. *Eyes*—diameter 3 in length of head. Profile from eyes to snout vertical; a rather high crest on head. Supraorbital tentacle two thirds as long as eye. *Teeth*—a pair of large posterior canines in lower jaw. *Fins*—a rather deep notch between divisions of dorsal fin. Posterior extremity of dorsal does not extend to caudal. Caudal with central rays longest. *Colour*—brownish, with ten brown bars along middle of body; a row of pearly-coloured oblong spots with dark margins above middle of body in its posterior half, and a similar row along its lower half. Dorsal fin with a dark margin edged with white, and posterior portion of second dorsal spotted.

Anal edged with black. Pectoral and ventral white; caudal barred in about six lines on either side of fin; head darkish anteriorly.

Hab. Andamans, whence two specimens up to 4 inches in length were brought by Dr. J. Anderson.

1135. (14.) Salarias dussumieri.

Salarias dussumieri, *Cuv. & Val. H. N. Poiss.* xi, p. 310; *Day, Fish. India*, p. 333, pl. lxx, fig. 7 (see synon.).

D. 12 | 20–21. P. 14. V. 3. A. 22. C. 11.

Length of head $5\frac{1}{2}$, of caudal fin 7, height of body 5 to 6 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Snout not overhanging the mouth; profile subvertical. A low crest on head in males, none in females; a fringed tentacle above orbit, another short one at front nostril, none on nape. *Teeth*—no canines. *Fins*—first dorsal half as high as body, but not quite equal to second dorsal, they are separated by a deep notch, second dorsal continued posteriorly on to caudal fin, which is rounded, the central rays being longest. Lower fourth of anal rays free. *Colour*—brownish, body more or less vertically banded, or with pairs of narrow bands. Three or four horizontal bands or rows of spots along first dorsal, and numerous oblique ones passing upwards and backwards on second, these lines often broken up into spots. Upper half of caudal banded in spots. Anal greyish, with a black outer edge.

Hab. East coast of Africa, seas of India to the Andaman Islands.

1136. (15.) Salarias periophthalmus.

Salarias periophthalmus, *Cuv. & Val. H. N. Poiss.* xi, p. 311, pl. 328 *Day, Fish. India*, p. 333, pl. lxix, fig. 5 (see synon.).

Chikoti, Maráthi.

D. 12 | 20. P. 15. V. 2. A. 21. C. 15.

Length of head $5\frac{1}{2}$, of caudal fin 5, height of body 7 in the total length. *Eyes*—high up; diameter 3 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Profile from eyes to snout vertical, but scarcely projecting beyond mouth. A simple tentacle about half length of eye above orbit, and a fringed one at the nostril. A low crest on head in some specimens, absent in others. *Teeth*—posterior canines in lower jaw. *Fins*—first dorsal lower than second, which is $\frac{2}{7}$ height of body, notch at division almost reaches base of fin. Dorsal fin not continued on to caudal, which is rounded. *Colour*—rose-coloured, with violet cross bands. An oblique blue band under eye, a small spot on cheek, and a large one on opercle. Two rows of blue spots, margined above and below by black along sides. Dorsal fin white, with five or six rows of spots; anal orange, with a grey or black outer edge. Caudal yellow, with small red spots.

Hab. Bombay; Andamans to the Malay Archipelago.

1137. (16.) Salarias striolatus.

Salarias striolatus, *Day, Fish. India*, p. 333.

D. 12 | 20–21. P. 14. V. 2. A. 20–21. C. 13.

Length of head $5\frac{1}{4}$, of caudal fin 8, height of body $5\frac{1}{2}$ in the total length. *Eyes*—comparatively large and high up; profile from eyes to snout vertical, overhanging mouth. A very low crest on head, absent in some (? female) specimens. A simple supraorbital tentacle as long as the eye, also a simple nasal one. *Teeth*—small posterior canines in lower jaw. *Fins*—dorsal deeply notched, not extended on to caudal, first portion very low, second higher, half height of body. Caudal rounded. *Colour*—greyish, with indistinct vertical cross bands. A blue spot below eye. Five or six horizontal black lines commence opposite end of pectoral, and break up into spots near caudal. Dorsal fins with two horizontal rows of spots, smaller but more distinct on the second dorsal. Anal with a row of blue spots along base, and a grey external edge. Five or six vertical and sinuous bands of spots on caudal. In some specimens, especially in those wanting the crest, the bands along the body are not well marked.

Hab. Andamans.

1138. (17.) Salarias oortii.

Salarias oortii, *Bleeker, Batavia Nat. Tijdsch.* i, p. 257; *Day, Fish. India, Suppl.* p. 798 (see synon.).

D. 12/19–21. P. 14. V. 2. A. 23–24. C. 13.

Length of head 7, of caudal fin 7, height of body 7 to $7\frac{1}{2}$ in the total length. *Eyes*—high up; diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, which is very slightly oblique. A crest on summit of head, a fringed tentacle above orbit and another at nostrils. *Teeth*—small canines in lower jaw. *Fins*—dorsal fin notched almost to its base, continuous with caudal; anterior portion two thirds as high as body, posterior at least one third higher; caudal rounded. *Colour*—stone-colour along back, becoming violet on sides and beneath; darker bands from the back, sometimes arranged in pairs. Anterior dorsal reddish violet, with several undulating narrow white lines and sometimes a small black blotch between first and second spines. Second dorsal with oblique white bands directed upwards and backwards; bluish marks or spots in its outer fourth. Caudal and anal with their outer thirds brownish.

Hab. Aden; east coast of India to the Malay Archipelago.

1139. (18.) Salarias bilitonensis.

Salarias bilitonensis, *Bleeker, Batavia Nat. Tijdsch.* xv, p. 231; *Day, Fish. India*, p. 334, pl. lxxi, fig. 1 (see synon.).

D. 12 | 20. P. 13. V. 2. A. 20–21. C. 15.

Length of head $5\frac{3}{4}$, of caudal fin 6, height of body 7 to 8 times

in total length. *Eyes*—in anterior third of head; interorbital space concave, with a slight ridge along the middle; profile from eyes to snout prominent, but not overhanging jaws. A rather large rounded crest on the head. A simple supraorbital tentacle, a short fringed one at the nostril. *Teeth*—a pair of rather small canines in lower jaw. *Fins*—a deep notch between the two dorsals; second dorsal continued on to base of caudal; first dorsal two thirds height of body, second posteriorly as high as body. Lower pectoral fin-rays longer than upper. Anal as high as first dorsal. *Colour*—greenish stone-coloured, with some bluish spots on head near eyes; about eight pairs of vertical streaks on body, and sometimes eight or ten longitudinal dark ones. Dorsal more or less marked with brown, in places forming spots; oblique brown marks on lower half of second dorsal, and a dark outer edge. Anal with a dark outer edge. Caudal dark, with six or seven narrow vertical bands.

Hab. Andamans to the Malay Archipelago.

1140. (19.) Salarias neilli.

Salarias neilli, *Day, P. Z. S.* 1888, p. 263; *Fish. India, Suppl.* p. 797.

D. 12/17. P. 13. V. 2. A. 19. C. 10.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—situated high up, 4 diameters in length of head, 1 from end of snout, and $\frac{1}{2}$ apart. Frontal profile very steep, the head as high as long. A fringed supraorbital tentacle about twice as long as eye, a small fringed one at nostril; no crest on head. *Teeth*—in a single row fixed, a very large curved canine posteriorly in lower jaw and a smaller curved one in upper. *Fins*—spinous portion of dorsal fin lower than rayed part, notch between the two portions well marked; longest dorsal ray half the height of body; neither dorsal nor anal fins attached to caudal, which is somewhat wedge-shaped and its rays branched. *Colour*—olive, with seven or eight short dark bands descending from dorsal fin down first third of body. Some dark bands radiate from the eye; a large black blotch below and somewhat behind orbit. Two semicircular brown bands across lower surface of mandibles. Fins darker than body.

Hab. Karáchi; out of ten specimens the longest is $2\frac{1}{4}$ inches.

1141. (20.) Salarias unicolor. (Fig. 103.)

Salarias unicolor, *Rüppell, N. W., Fische*, p. 136; *Day, Fish. India*, p. 334, pl. lxx, fig. 6 male, 5 female (see synon.).

D. 12 | 17–18. P. 14. V. 2. A. 18–19. C. 10.

Length of head 5 to $5\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—rather prominent, $1\frac{1}{2}$ to 2 diam. from end of snout, $\frac{1}{2}$ apart. Interorbital space slightly concave; forehead does not project beyond mouth. In the *male* a well-developed crest on

occiput, and a fringed tentacle twice as long as eye above orbit; another short one at anterior nostril. In the *female* no crest, a fringed tentacle about as long as eye above orbit; a short one at anterior nostril. *Teeth*—no canines. *Fins*—a deep notch between

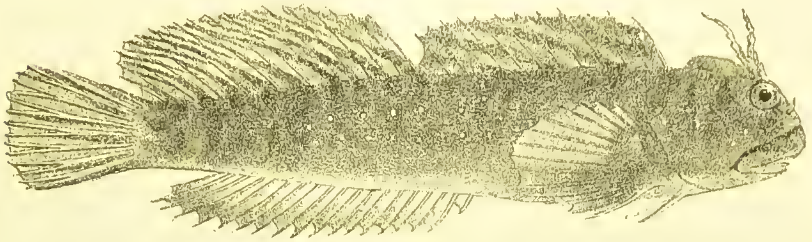

Fig. 103.—*Salarias unicolor.*

two portions of dorsal, the anterior much lower than the posterior; fin not continuous with caudal, which is nearly square. All fin-rays except caudal simple. *Colour*—*males* olive-brown, with distinct blackish blotches along the side and on dorsal fin; two or three rows of blue spots on body and head. *Females* olive-brown, becoming white beneath, and marbled all over with brown lines forming large insulated spaces. Head and upper two thirds of body dotted with light blue; fins yellowish; dorsal and anal horizontally and sinuously banded in spots; caudal with five or six vertical dark bands. A brown band, divided by a light blue line, at base of pectoral, which is yellowish barred with brown.

Hab. Red Sea, east coast of Africa, and Karáchi.

1142. (21.) Salarias alboguttatus.

Salarias alboguttatus, *Kner, Sitzb. Wien. Ak.* lvi, 1867, p. 724, pl. iv, figs. 4, 6; *Day, Fish. India*, p. 334, *Suppl.* p. 798 (see synon.).

D. 12 | 18. P. 15. V. 1/2. A. 19–20. C. 13.

Length of head 6, of caudal fin 7, height of body $5\frac{1}{3}$ in the total length. *Eyes*—high up; profile to snout slightly oblique, not overhanging jaws. A low crest on head; a fringed tentacle above orbit, a similar one at nostril. *Teeth*—small posterior canines in lower jaw. *Fins*—first dorsal slightly lower than second, the two divided by a deep notch, the second two thirds height of body, not continued to base of caudal fin, which is rounded. *Colour*—light brown, with eight pairs of well-marked vertical bands as wide as ground-colour. An oval blue spot behind eye. Many small round dark-edged spots on head; two rather large brown ones at base of pectoral, which is brownish. Two or three rows of white spots in lower and posterior half of body. First dorsal brown, second white, both with some oblique dark bands. A dark spot at base of

caudal, which is banded with brown spots. Anal light-coloured, with a dark outer edge, which has a narrow light margin.

Hab. Andamans; growing to $2\frac{1}{2}$ inches in length.

1143. (22.) Salarias frenatus.

Salarias frenatus, *Cuv. & Val. H. N. Poiss.* xi, p. 342; *Day, Fish. India,* p. 335, pl. lxx, fig. 9 (see synon.).

Tengali, Maráthi.

D. 12 | 14–16. P. 14. V. 1/2. A. 18. C. 13.

Length of head 5, of caudal fin 6, height of body $6\frac{1}{2}$ to 7 in the total length. *Eyes*—high up, rather above 1 diameter from end of snout; anterior profile very oblique. No crest. A short fringed tentacle above orbit, another at nostril, and a simple one on nape. *Teeth*—posterior canines in lower jaw. *Fins*—first dorsal lower than second, the two separated by a well-marked notch. Second dorsal two thirds height of body, continued on to base of caudal. *Colour*—fawn-colour, becoming nearly white on abdomen, four white lines edged with grey from eye to throat, and one or two from one eye to the other. Body with vertical bands, and irregularly blotched and spotted darker. Dorsal fins with oblique dark lines; caudal with vertical bands or spots; anal whitish, with a dark outer edge; upper half of pectoral light-coloured, its lower half dark.

Hab. Malabar and Bombay.

1144. (23.) Salarias vermiculatus.

Salarias vermiculatus, *Cuv. & Val. H. N. Poiss.* xi, p. 301; *Day, Fish. India,* p. 335 (see synon.).

D. 12–13 | 15. P. 14. V. 2. A. 18–19. C. 11.

Length of head 5 to $5\frac{1}{2}$, of caudal fin 6, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—high up, diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $\frac{3}{4}$ apart. Snout not overhanging mouth. No crest. A moderately long fringed tentacle over orbit, a small fringed one over anterior nostril, and a fine occipital one; upper lip fringed. *Teeth*—large canines in lower jaw. *Fins*—a deep notch between first and second dorsal, the latter continuous with base of caudal; first dorsal lower than second, which is highest posteriorly; lower six or eight pectoral rays with free extremities, upper five very short. Anal a little in advance of second dorsal, anterior 13 anal rays with free extremities, interspinous membrane deeply notched; caudal cut square. *Colour*—brownish above, becoming bluish white below, with a series of nine brown bars descending to lateral line. Body, head, and fins reticulated with brown lines, enclosing circular or irregularly formed spaces.

Hab. East coast of Africa, and Andamans; attaining at least 8 inches in length.

1145. (24.) Salarias marmoratus.

Blennius marmoratus, *Bennett, Zool. Jour.* iv, p. 35.
Salarias marmoratus, *Day, Fish. India,* p. 335; *Suppl.* p. 798 (see synon.).

D. 12 | 15. P. 14. V. 3. A. 18. C. 11.

Length of head $4\frac{3}{4}$, of caudal fin $7\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—high up, rather above 1 diameter from end of snout; anterior profile very oblique. No crest. A fringed supra-orbital tentacle as long as eye, another short one at nostril, having some filaments at its base; one, also fringed, at nape. *Teeth*—a strong posterior canine in lower jaw. *Fins*—dorsal fin deeply notched, first lower than second, which is nearly $\frac{1}{2}$ height of body, but does not extend to caudal, the interspace (*from base of last ray*) equal to $\frac{1}{10}$ length of dorsal. *Colour*—brownish yellow, with cloudy blackish-brown spots in two series, on the brown are yellow spots. Fins, except ventral, spotted with yellow or brown.

Hab. Ceylon and Sandwich Islands; attaining 4 inches in length

1146. (25.) Salarias bicolor.

Salarias bicolor, *Tickell, MSS.*; *Day, Fish. India, Suppl.* 1888, p. 798

D. 11 | 17. V. 2. A. 18.

Length of head 5, of caudal fin 5, height of body 6 (Tickell's figure). Snout not overhanging mouth; no crest. *Fins*—first dorsal as high as body, separated by a deep notch from second dorsal, which is not confluent with caudal. *Colour*—anterior half of body as far as origin of second dorsal dark blue (smalt), posterior half carmine orange. Dorsal fins sepia tinged with smalt, base of second dorsal orange; caudal and anal orange, tipped and margined with sepia; ventrals whitish.

Hab. A specimen $1\frac{3}{8}$ inches in length was obtained by Colonel Tickell from Saddle Island, off Kyoukhypoo, Arracan.

3. Genus ANDAMIA, Blyth.

Differs from *Salarias* in possessing an adhesive sucker behind and below the symphysis of the mandibles. Caudal rays unbranched.

Blyth observes that this genus has broad expanded pectorals, as in the cyprinoid *Homaloptera.*

1147. (1.) Andamia heteroptera. (Fig. 104.)

Salarias heteropterus, *Bleeker, Act. Soc. Sc. Ind. Ned.* ii, *Amboina,* p. 65.
Andamia expansa, *Blyth, J. A. S. B.* xxvii, 1858, p. 271; *Day, Fish. India,* p. 336, pl. lxxi, fig. 2 (see synon.).

D. 16 | 18. P. 14–15. V. 3. A. 25–26. C. 14.

Length of head $6\frac{1}{2}$ to 7, height of body 8 to 9 in the total length. *Eyes*—elevated, diameter 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Body subcylindrical, compressed. Head compressed; snout rounded anteriorly; a short branching tentacle over posterior third of orbit. A small simple extension forming a sort of tentacle at both nostrils; lips thick, upper continuous with lower, which below the symphysis of the mandible forms a broad adhesive sucker. *Teeth*—in a fine single row implanted in the gums of both jaws; no canines. *Fins*—dorsal fin not notched, it commences a short distance behind occiput; spines free to a greater or less extent, in some the second is the longest. In some specimens the two dorsals are continuous, in others second dorsal is higher than first; it never appears to exceed height of body; anal lower than dorsal, all its rays free in their lower halves. Pectoral with outer half horizontal, and inner vertical, rays free at the extremities; caudal with rays undivided and their extremities free. *Colour*—olive, banded with a darker shade; head spotted. Fins with dark edges, except the anal, which has a white margin.

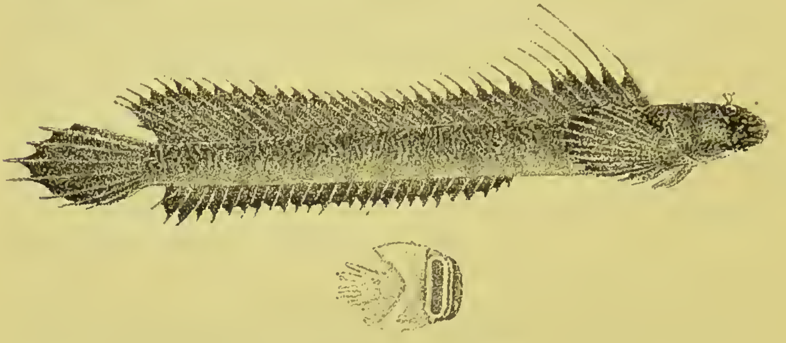

Fig. 104.—*Andamia heteroptera.*

Hab. Andamans and Nicobars to Amboina; attaining 3 or 4 inches in length.

4. Genus **TRIPTERYGIUM**, Risso.

Branchiostegals six; pseudobranchiæ. Body moderately elongate. Villiform teeth in jaws and palate. Three dorsal fins, the first two consisting of spines, the first fin containing fewer spines than the second, which is also of greater extent than the third rayed fin. Ventrals jugular, with two rays. Scales present, small or of medium size.

Geographical Distribution. Mediterranean, Bay of Bengal and Malay Archipelago to New Zealand.

1148. (1.) **Tripterygium trigloides.**

Tripterygium trigloides, ? *Bleeker, Batavia Nat. Tijdsch.* xv, p. 234; *Day, Fish. India*, p. 336 (see synon.).

D. 3 | 13–14 | 10. P. 16. V. 2. A. 18–20. C. 21.

Length of head $3\frac{1}{2}$ to 4, of caudal 6 to $6\frac{1}{4}$, height of body 6 in the total length. *Eyes*—high up, profile in front of eyes oblique, upper jaw the longer. A fringed tentacle over orbit and another at nostrils. *Fins*—caudal rounded. *Colour*—light brown, with vertical bars on body, and fine black spots. In *males* upper surface of head orange, lower half Prussian blue. A dark blue ocellus, with an orange margin, on the base of the pectoral fin First dorsal orange. In *females* lower surface of head light blue, and ocellus on pectoral less distinctly marked.

Hab. Waltair, Vizagapatam.

5. Genus **ACANTHOCLINUS**, Jenyns.

Six branchiostegals; pseudobranchiæ. Body elongate. Cleft of mouth of moderate width; gills united beneath the throat. Teeth in jaws, vomer, and palate. Dorsal fin single, occupying most of the length of the back, chiefly composed of spines; anal long, and having more spines than rays. Ventral jugular, consisting of one spine and three rays; caudal distinct. Scales cycloid. Latera line present or absent. No air-bladder.

Geographical Distribution. Coasts of India and New Zealand.

1149. (1.) **Acanthoclinus indicus.** (Fig. 105.)

Acanthoclinus indicus, *Day, Fish. India, Suppl.* 1888, p. 798.

D. 21 | 4. P. 16. V. 1/3. A. 10/4. C. 17. L. l. 40. L. tr. 14.

Length of head 4, height of body 3 in the total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of snout, and $\frac{3}{4}$ apart. Two strong opercular spines. *Fins*—dorsal spines strong; pectorals rounded; ventrals long; caudal rounded. *Lateral line*—

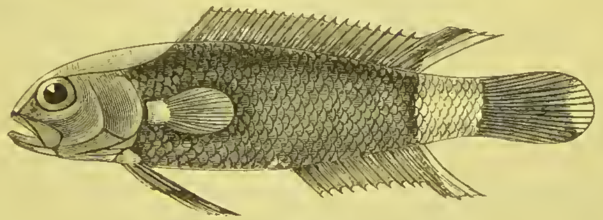

Fig. 105.—*Acanthoclinus indicus.*

absent. *Colour*—brownish black, with a milk-white band commencing on the front end of the dorsal fin, and extending to the snout; a white band round the free portion of the tail; a white spot at the base of the pectoral fin; one on either side of the base of the mandibles, one on the isthmus. The posterior half of the ventral fin, also a ring round the vent white, as well as the tip of the caudal fin.

Hab. Madras, where one example an inch long was captured.

6. Genus **CRISTICEPS**, Cuv. & Val.

Branchiostegals six; pseudobranchiæ. Body elongate, covered with small or rudimentary scales. Gill-opening wide. Cleft of mouth of moderate width, snout short. Usually some tentacles on the head. Fine teeth on the jaws and vomer. Two separate dorsal fins, the anterior composed of three spines, the posterior with many rays, the majority of which are spines. Ventral jugular, with one spine and two or three rays. Pyloric appendages absent. Viviparous.

Geographical Distribution. Mediterranean, Ceylon to the Malay Archipelago, coasts and rivers of Australia and Tasmania.

1150. (1.) **Cristiceps halei.** (Fig. 106.)

Cristiceps halei, *Day, Fish. India, Suppl.* 1888, p. 799.

D. 3 | 27/4. P. 13. V. 1/2. A. 2/19. C. 14.

Length of head $4\frac{1}{6}$, height of body $4\frac{3}{4}$ in the total length. *Eyes*—4 diameters in length of head, 1 diam. from end of snout, and nearly 1 apart. A broad-fringed supraorbital tentacle and a short simple one on the snout. *Fins*—first dorsal commences above hind edge of eye, its spines are higher than the front ones in second dorsal. All pectoral rays unbranched; anal with two spines, fifteen unbranched and four divided rays. Caudal wedge-shaped.

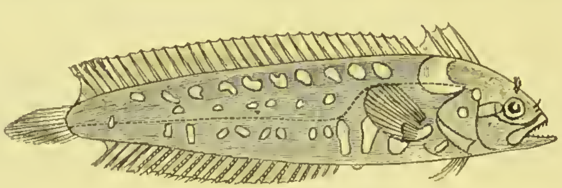

Fig. 106.—*Cristiceps halei.*

Scales—rudimentary. *Lateral line*—with a rather strong curve anteriorly. *Colour*—brownish yellow, with a white mark behind the lower half of the orbit, and some irregularly shaped white markings on the occiput and gill-covers, two more at the base of the pectoral fin, a row of about 12 below the base of the spinous dorsal fin, and two more badly developed rows along the sides of the body.

Hab. Colombo (*Haly*); the figure is of natural size.

7. Genus **XIPHASIA**, Swainson.

Syn. *Nemophis*, Kaup; *Xiphogadus*, Günther.

Branchiostegals six. Body elongate, eel-like, and posteriorly compressed. Suborbital bone rough. Eyes lateral. Gill-opening

small, placed before the base of the pectoral fin. Teeth in maxilla of subequal size, conical, and close together, with a lateral canine; in the lower jaw more curved; palate edentulous. Fin-rays unbranched, flexible; the dorsal commences on the head. Ventral consisting of three rays inserted anteriorly to the branchial orifice.

1151. (1.) Xiphasia setifer. (Fig. 107.)

Xiphasia setifer, *Swainson, Cab. Cycl. Fishes &c.* ii, p. 259; *Day, Fish. India,* p. 337, pl. lxxiii, fig. 1, *Suppl.* p. 799 (see synon.).

Tonkah-talawaree, Tel

D. 128–129 (223?). P. 13. V. 3. A. 115–116. C. 12.

Length of head 16 in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, from $\frac{1}{2}$ to $\frac{3}{7}$ diam. apart, and 1 diam. from end of snout. Upper profile of head rounded, and upper jaw slightly the longer. *Teeth*—the large lower canine is received into a groove in the roof of the mouth. *Fins*—the dorsal commences above or slightly before the orbits, and extends posteriorly to root of the caudal fin, to which it is not joined; the anal begins beneath the seventeenth dorsal ray, and similarly reaches the root of the caudal

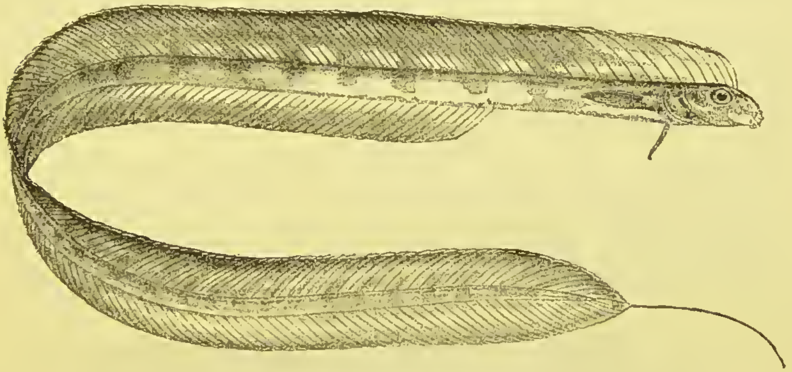

Fig. 107.—*Xiphasia setifer.*

fin. The rays of both fins are simple, unbranched, and higher than the body. In Australian examples the caudal fin was distinct with no elongate central ray, but this last was observed by Jerdon at Madras. *Colour*—alternate bands of dark and light ash; the fins opaline; dorsal with a black and narrow white-edged margin, widening anteriorly into blotches.

Hab. Coromandel coast of India and New South Wales, possibly Madagascar. This fish grows to at least 14 feet in length.

Family XXXI. TRICHONOTIDÆ.

Branchiostegals seven; pseudobranchiæ. Gill-openings wide. Body elongate, subcylindrical. One or two dorsal fins occupying almost the entire length of the back. Fin-rays branched. Ventrals jugular, 1/5. No prominent papilla near the vent. Scales cycloid, of moderate size. Air-bladder and pyloric appendages absent.

Geographical Distribution. Small fishes of the seas and coasts of India, the Malay Archipelago, and New Zealand.

1. Genus **TRICHONOTUS**, Bl. Schn.

Head depressed and pointed, with the lower jaw the longer. Cleft of mouth deep, almost horizontal. Eyes of moderate size, closely approximating. Conical teeth in jaws, vomer, and palatine bones. One long dorsal fin; the first few rays elongate, or slightly detached.

Geographical Distribution. Andamans to the Malay Archipelago.

1152. (1.) **Trichonotus setiger.** (Fig. 108.)

Trichonotus setiger, *Bl. Schn. Syst. Ich.* p. 179, t. xxxix; *Day, Fish. India, Suppl.* 1888, p. 795 (see synon.).

D. 2/45. P. 11. V. 1/5. A. 37. C. 13. L. l. 58. L.tr. 6.

Length of head 4, height of body 10 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, directed somewhat upwards. *Teeth*—a single row in the jaws, vomer,

Fig. 108.—*Trichonotus setiger.*

and palatines, somewhat enlarged in the premaxillaries. *Fins*—owing to the small size of the example, it is difficult to count the rays. Dorsal commences above axil of pectoral, first two rays not elongate (? age or sex), but slightly divided from the remainder of the fin.

Hab. An example, measuring a little over 1½ inches in length, was obtained at the Andamans.

Family XXXII. CEPOLIDÆ.

Tænioidei, pt., Cuv.

Branchiostegals six; pseudobranchiæ. Body elongate and compressed. Eyes large and lateral. Gill-openings wide, the membranes scarcely united under the throat. Teeth in jaws of medium size. A long dorsal and anal fin more or less continuous with the caudal. Ventrals thoracic, 1/5. No prominent papilla near the vent. Scales cycloid, small.

1. Genus **CEPOLA**, Linnæus.

Syn. *Acanthocepola*, Bleeker.

Head obtuse. Cleft of mouth oblique, gape wide. Preopercle more or less armed. Palate edentulous.

Geographical Distribution. Seas of Europe, India, China, and Japan.

Synopsis of Indian Species.

D. more than 90. Black spot on dorsal behind 8th ray .... 1. *C. indica*, p. 329.
D. 67–74. Two rows of golden spots along sides .... 2. *C. abbreviata*, p. 330.

1153. (1.) **Cepola indica.**

Cepola indica, *Day, Fish. India, Suppl.* 1888, p. 796.

D. more than 90. P. 17. A. more than 90.

Length of head 8, height of body 8 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{2}{3}$ apart. A strong spine at angle of preopercle, one on vertical, and four on horizontal margin. *Teeth*—a single row in each jaw, a small curved canine in an outer row in lower jaw, also one in upper but not in a separate row. *Fins*—dorsal commences slightly behind orbit, its rays are unbranched, they increase in length to sixth, which is $\frac{2}{3}$ height of body, from this they gradually decrease; there appear to be over 100 rays. Anal begins beneath ninth dorsal spine, and has nearly as many rays as the dorsal; both it and the dorsal are joined to the caudal, which is pointed. *Scales*—small but distinct, cheeks scaled, none on opercles. *Lateral line*—commences from upper margin of opercle, then ascends to close to dorsal fin and becomes obsolete after first third of body. *Colour*—brick-red, dorsal and anal fins with dark outer edges, an oval black spot between eighth and eleventh dorsal rays.

Hab. Madras.

1154. (2.) **Cepola abbreviata.** (Fig. 109.)

Cepola abbreviata, *Cuv. & Val. H. N. Poiss.* x, p. 403; *Day, Fish. India*, p. 324, pl. lxviii, fig. 4 (see synon.).

Chawa aku or *Chava waku*, Tamil.

D. 67–74. P. 19. V. 1/5. A. 67–74. C. 13. Cæc. pyl. 8.

Length of head 6 to 7, height of body $10\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ diam. from end of snout, and $\frac{1}{2}$ apart. Vertical margin of preopercle rather rugose, a strong spine at angle, four or five along lower edge. *Teeth*—a single row in each jaw, those in middle of mandible rather the largest. *Fins*—dorsal commences above hind edge of opercle, its rays, except last

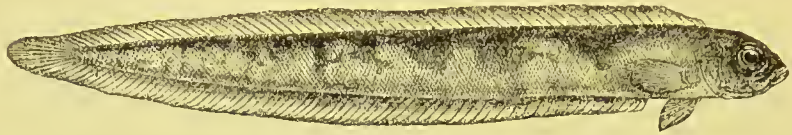

Fig. 109.—*Cepola abbreviata.*

two or three, are unbranched. Anal commences beneath 8th dorsal ray, it and dorsal are continuous with caudal. *Scales*—small but distinct; present on cheeks and opercles. *Colour*—reddish, with about 12 pairs of red or golden spots along sides. Caudal rays said by Cantor to be black.

Hab. Coromandel coast of India, Malay Archipelago and China; attaining at least a foot in length.

Family XXXIII. RHYNCHOBDELLIDÆ.

Scomberoidei, pt., Cuv. & Val.; *Mastacembelidæ*, Günther.

Pseudobranchiæ absent. Gill-opening, a slit on the side of the head; gills four. Body elongate, eel-shaped. Humeral arch not suspended from the skull. Lower jaw long, but without much power of motion. A single long dorsal fin, its anterior portion consisting of free spines; anal with three spines anterior to it; soft dorsal and anal of similar extent; ventral fins absent. Air-bladder present.

Geographical Distribution. Fresh and brackish waters of West Africa, Syria, Sind, India, Ceylon, Burma, the Malay Archipelago. They are found far inland, and often at great elevations.

Uses. Excellent as food.

Synopsis of Indian Genera.

Snout transversely striated beneath. No preorbital spine .... 1. RHYNCHOBDELLA.
Snout not transversely striated beneath. A preorbital spine .... 2. MASTACEMBELUS.

Genus 1. RHYNCHOBDELLA, Bloch & Schneider.

Syn. *Mastacembelus*, Gronov.

Branchiostegals six. Cleft of mouth narrow; a long fleshy snout, concave beneath, and transversely striated. Minute teeth on jaws and vomer. Dorsal and anal not confluent with the caudal fin. Scales small, cycloid. Lateral line present. Air-bladder elongate. Two cæcal appendages.

Geographical Distribution. Deltas of all large rivers of Sind, India, and Burma; preferring muddy ponds or similar pieces of water.

1155. (1.) Rhynchobdella aculeata. (Fig. 110.)

Ophidium aculeatum, *Bloch, Ich.* tab. 159, fig. 2.
Rhynchobdella aculeata, *Jerdon, Mad. Jour. L. Sc.* xv, 1848, p. 147; *Day, Fish. India*, p. 338, pl. lxxii, fig. 1 (see synon.).

Cul, Mona aral, and *Aral,* Tam.; *Bommiday,* Telugu; *Theliya,* Singhalese (Tennant); *Tou-rah,* Assam.; *Bara gutti* and *Thuri,* Ooriah; *Nga mawaydoh nya,* Burmese; *Sand* and *Spined Eels.*

D.16–20 | 44–54. P.23. A.2–3 | 44–52. C.15. Vert.23/40. C. p. 2.

Length of head 5 to 6, height of body 8 to 10 in the total length. *Eyes*—1 diameter apart. Snout with a trilobed extremity, the inferior surface concave, transversely striated. Preopercle entire, no preorbital spine. *Fins*—first dorsal consisting of spines, which increase in length behind; caudal rounded. Second preanal spine

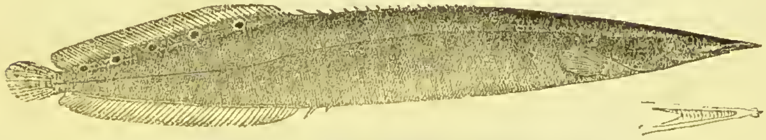

Fig. 110.—*Rhynchobdella aculeata.*

longest and strongest. *Air-bladder*—extends from head to anus. *Colour*—brownish or greenish, marbled superiorly, becoming yellowish along abdomen; a light band along body just above lateral line. A series (sometimes wanting) of from three to nine large black ocelli, having a white or buff edge, along base of soft dorsal. Caudal with from six to eight vertical brown bars, fins otherwise greyish. Pectoral sometimes yellow. The body has several longitudinal bands in Sind examples.

Hab. Brackish waters within tidal influence, in deltas of large

Indian, Burmese, and Sind rivers, extending to Borneo and the Moluccas; absent from Malabar; attaining about 15 inches in length. This fish conceals itself in the mud, and becomes drowned in water if unable to reach the surface, as it apparently requires to respire air directly.

2. Genus **MASTACEMBELUS**, Cuv. & Val.

Branchiostegals six. Cleft of mouth narrow; a long fleshy appendage to the snout, which is not transversely striated beneath. Preopercle generally spiny at its angle; a preorbital spine. Teeth in jaws minute. Scales small, cycloid. Lateral line present. Air-bladder elongated.

Geographical Distribution. That of the family. The existence of species of this genus in West Africa is very interesting, as similar cases are observed in other divisions of the animal kingdom.

Synopsis of Indian Species.

A. Vertical fins distinct from the caudal.
- D. 33–34 | 81–94. Uniform brown, or covered with large yellow blotches .. 1. *M. unicolor*, p. 332.
- D. 28–29 | 50–52. Yellow with vertical blue stripes .... 2. *M. zebrinus*, p. 333.
- D. 24–26 | 30–42. Sides spotted with yellowish white; more or less banded. 3. *M. pancalus*, p. 333.

B. Vertical fins confluent with the caudal.
- 30 scales between lateral line and base of first dorsal ray .... 4. *M. armatus*, p. 334.
- 15 scales between lateral line and base of first dorsal ray .... 5. *M. guentheri*, p. 334.

1156. (1.) **Mastacembelus unicolor.**

Mastacembelus unicolor (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* viii, p. 453; *Day, Fish. India*, p. 339, pl. lxxii, fig. 2 (see synon.).

D. 33–34 | 81–94. P. 27. A. 3 | 75–98. C. 25.

Length of head $5\frac{1}{4}$, height of body $10\frac{1}{2}$ in the total length. *Eyes*—1 diameter apart. Snout with two small tentacles near its extremity. Three strong denticulations at angle of the preopercle. *Fins*—dorsal spines short, increasing in length posteriorly, they commence over middle of pectoral. Second dorsal and anal divided from the caudal by a deep notch; caudal rounded. Second pre-anal spine the longest and strongest. *Colour*—brownish above, lighter beneath; three or four rows of oblong, rounded, or irregularly shaped yellow spots or blotches along the sides; vertical fins with a black yellow-margined outer edge. Pectorals said to have

two cross-bands. The original specimen was of a uniform colour.

Hab. Burma to Java.

1157. (2.) **Mastacembelus zebrinus.** (Fig. 111.)

Mastacembelus zebrinus, *Blyth, J. A. S. B.* xxvii, 1858, p. 281; *Day, Fish. India,* p. 339, pl. lxxii, fig. 3 (see synon.).

Nga-ma-way-doh-wettung or *Nga mwey to,* Burmese; *Nga yeng boo* at Tavoy.

D. 28–29 | 50–52. P. 19. A. 3 | 51–56. C. 19.

Length of head 6 to 7, height of body 7 to 7½ in the total length. *Eyes*—small. Snout trilobed at its extremity. Three strong denticulations at angle of preopercle. *Fins*—dorsal spines short, increasing in length posteriorly, they commence over middle of pectoral fin. Soft dorsal and anal separated from caudal by a notch; caudal rounded. Second preanal spine longest and strongest. *Scales*—20 rows between lateral line and commencement of soft

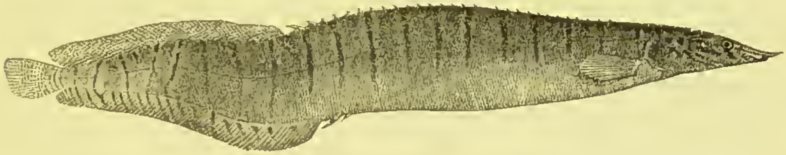

Fig. 111.—*Mastacembelus zebrinus.*

dorsal. *Colour*—greenish along back, lighter on sides and beneath; bluish vertical bands, either edged with golden, or else the two colours alternating. Dorsal and caudal fins banded in dots; anal with the body bands continued on to it, and having intermediate dark ones.

Hab. Common throughout the fresh waters of Burma, replacing *M. pancalus* of Bengal and Assam, and found in the Irrawaddy far above Ava. The species attains at least one foot in length.

1158. (3.) **Mastacembelus pancalus.**

Macrognathus pancalus, *Ham. Buch. Fish. Ganges,* pp. 30, 364, pl. 22, fig. 7.

Mastacembelus pancalus, *Day, Fish. India,* p. 340, pl. lxxii, fig. 4 (see synon.).

Chen-da-la, Gürchee, and *Gro-age,* Punj.; *Ju-gar,* N.W. Prov.; *Par-pa-raal,* Tel.; *Turi* and *Bahru,* Ooriah; *Tu-rah,* Assam.; *Gangr-gongti, Gochi, Pangkal,* Bengali.

D. 24–26 | 30–42. P. 19. A. 3 | 31–46. C. 12.

Length of head 5 to 5½, height of body 6½ to 7 in the total length

Eyes—small, 1 diameter apart. Snout trilobed at its extremity. Strong denticulation at angle of preopercle, and three to five teeth along the lower border. *Fins*—dorsal spines short, increasing in length posteriorly, they commence over middle of pectoral. Soft dorsal and anal separated from caudal by a notch; caudal rounded. Second preanal spine longest and strongest. *Scales*—18 rows between lateral line and commencement of dorsal rays. *Colour*—greenish olive along back, yellowish beneath, many yellowish-white spots over sides. Posterior portion of the body often vertically striped. Soft dorsal, pectoral, caudal, and anal yellow, with numerous black spots.

Hab. Large rivers of India and localities near the sea. I have taken this species in the Ganges near Hardwar, also at Jubbulpore, but have not seen it in the Coromandel coast south of the Kistna. It attains at least 7 inches in length.

1159. (4.) Mastacembelus armatus.

Macrognathus armatus, *Lacép. H. N. Poiss.* ii, p. 286.
Mastacembelus armatus, *Day, Fish. India,* p. 340, pl. lxxiii, fig. 3 (see synon.).

Vambat and *Bahm,* Maráthi; *Bahm, Vahm,* and *Gro-age,* Punj. and Sind; *Kul-aral* and *Sha-ta-rah,* Tam.; *Mudi-bom-mi-day,* or "*Old Rhynchobdella,*" Tel.; *Bahm, Bummi,* and *Gonti,* Ooriah and Beng.; *Nya-maway-doh-nga,* Burm.; "*Thorny-backed eel.*"

D. 32–39 | 74–90. P. 23. A. 3 | 75–88.

Length of head from $6\frac{1}{2}$ in the young to $7\frac{1}{2}$ in the adult, height of body 11 to 12 in the total length. *Eyes*—one diameter apart. The width of the body alters with age. Snout trilobed at its anterior extremity. Angle of preopercle with two or three strong denticulations. *Fins*—dorsal spines commence over middle of pectoral, the posterior longest. Vertical fins confluent. *Scales*—about 30 rows between lateral line and base of first dorsal ray. *Colour*—usually rich brown, lighter on abdomen. In some a blackish band through the eye is continued in an undulating course along upper half of side; sometimes a row of black spots occurs along base of soft dorsal, and short black bands over back under dorsal spines. This is the common form in Calcutta, Assam, and along the Himalayas. Pectoral usually spotted, dorsal and anal usually banded or spotted.

Hab. From Sind, throughout the fresh and brackish waters of the plains and hills of India, Ceylon, and Burma to China; attaining two feet or more in length.

1160. (5.) Mastacembelus guentheri.

Mastacembelus guentheri, *Day, Fish. Malabar,* p. 154, pl. xi, *and Fish. India,* p. 341, pl. lxxiii, fig. 2 (see synon.).
? Mastacembelus malabaricus, *Jerdon, Mad. Jour. L. Sc.* xv, 1848, p. 147.

D. 27–30 | 60–74. P. 15. A. 3 | 62–75. C. 9.

Length of head 7, height of body 8 to 9 in the total length. *Eyes*—one diameter apart. Snout trilobed at its extremity. Angle of preopercle with two strong denticulations which decrease in size with age, the young have the lower margin also serrated. *Fins*—dorsal spines commence on vertical behind end of pectoral fin and are short, the posterior longest. Vertical fins confluent, a slight notch apparent in adult, but not seen in the young. *Colour*—olive or greenish brown, dull yellow below, some black bands radiate from the eye and cross below the jaws. A light band runs along upper edge of lateral line, short oblique bars or marblings on body and vertical fins.

Hab. Malabar coast; attaining 8 or 9 inches in length.

Family XXXIV. SPHYRÆNIDÆ.

Percoidei, pt., Cuv.

Branchiostegals seven; pseudobranchiæ. Body elongate, subcylindrical. Eyes of moderate size, lateral. Cleft of mouth deep. Teeth in the jaws large and cutting; present on palate, none on vomer. Two short dorsal fins remote from each other; anal similar to the second dorsal; ventrals abdominal, 1/5. Scales small, cycloid. Lateral line continuous. Air-bladder present, bifurcated anteriorly. Pyloric appendages in moderate numbers or numerous.

Geographical Distribution. Carnivorous fishes found in the seas of temperate and tropical regions. The Barracuda, *Sphyræna picuda*, is often more dreaded in the seas it inhabits than the shark.

1. Genus **SPHYRÆNA**, Artedi.

Definition as in the family.

Synopsis of Indian Species.

L. tr. 18/22.	Operele with two points	1. *S. jello*, p. 335.
L. tr. 14/18.	Opercle with a single point....	2. *S. acutipinnis*, p. 336.
L. tr. 11/16.	Opercle with two points	3. *S. commersonii*, p. 336.
L. tr. 9/17.	Opercle ending in a single point.	4. *S. obtusata*, p. 337.

1161. (1.) **Sphyræna jello.**

Sphyræna jello, *Cuv. & Val. H. N. Poiss.* iii, p. 349; *Day, Fish. India*, p. 342 (see synon.).

Joban tol, Maráthi; *Cheelahoo*, Mal.; *Jellow*, Tel.

D. 5 | 1/9. A. 1/8–9. C. 17. L. l. 120. L. tr. 18/22. Vert. 12/12.

Length of head from $3\frac{1}{2}$ to 4, height of body 8 to 9 in the total length. *Eyes*—diameter from 5 in the young to $6\frac{1}{2}$ in length of

head, $2\frac{1}{2}$ to 3 diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Height of head equals $\frac{4}{11}$ of length, width $\frac{2}{7}$. Lower jaw the longer, a fleshy tubercle at end of symphysis. Opercle with two points. *Teeth*—small in upper jaw, about 18 in mandible, larger behind; about six large ones in anterior portion of palatines. *Fins*—first dorsal commences above end of pectoral and a little behind origin of ventral; middle caudal rays about $\frac{4}{9}$ the length of longest outer ones, the upper lobe often the longer. *Colour*—grey above, white on abdomen. On upper part of side a festooned band intersects the lateral line, or a number of short vertical bands (up to 22) cross it. Ventrals whitish; other fins yellowish with fine black points, most numerous towards their margins.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond; attaining at least 5 feet in length.

1162. (2.) Sphyræna acutipinnis.

Sphyræna acutipinnis, *Day, Fish. India,* p. 342, pl. lxxix, fig. 1.

D. 5 | 1/9. P. 15. V. 1/5. A. 1/8. C. 17. L. l. 120. L. tr. 14/18.

Length of head $3\frac{1}{2}$, height of body $9\frac{1}{2}$ in the total length. *Eyes*—diameter 6 in length of head, $2\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Height of head equals postorbital length, width a little less. Lower jaw considerably produced beyond upper, which is truncated; a small fleshy knob at end of mandible. Opercle ends in a single fleshy point. *Teeth*—about 18 on each ramus of lower jaw, half of them moderately large, a large fang anteriorly in lower and two in upper jaw, three large teeth on palate. *Fins*—first dorsal commences opposite end of pectoral, and a little anterior to origin of ventral. Caudal deeply forked. *Scales*—some on opercles. *Colour*—dark leaden above, dull white beneath. Fins stained with grey.

Hab. The specimen described was from Sind, and 20 inches in length.

1163. (3.) Sphyræna commersonii.

Sphyræna commersonii, *Cuv. & Val. H. N. Poiss.* iii, p. 352; *Day, Fish. India,* p. 343 (see synon.).

D. 5 | 1/9. P. 14. V. 1/5. A. 1/9. C. 19. L. l. 90–95. L. tr. 11/16.

Length of head $3\frac{3}{4}$ to 4, height of body $7\frac{1}{2}$ to 9 in the total length. *Eyes*—diameter from 5 in young to $7\frac{1}{2}$ in length of head, $2\frac{1}{4}$ to $3\frac{1}{4}$ diam. from end of snout, and 1 to $1\frac{3}{4}$ apart. Height of head equals about $\frac{1}{2}$ its length, width not quite $\frac{1}{3}$. Lower jaw the longer, with a fleshy tubercle at the end of the symphysis. Opercle with two points. *Teeth*—upper smaller than lower; about six large ones in anterior portion of palatines. *Fins*—first dorsal commences above ventral and opposite last fourth or even end of pectoral. *Colour*—bluish above, silvery beneath; dorsal, caudal, and anal black, with white tips.

Hab. Seas of India to the Malay Archipelago and beyond; attaining at least $4\frac{1}{2}$ feet in length.

1164. (4.) **Sphyræna obtusata.** (Fig. 112.)

Sphyræna obtusata, *Cuv. & Val. H. N. Poiss.* iii, p. 350; *Day, Fish. India*, p. 343, pl. lxxi, fig. 5 (see synon.).

Gánjya, Maráthi.

D. 5 | 1/9. P. 14. A. 1/9. C. 17. L. l. 90. L. tr. 9/17. C. p. about 24.

Length of head $3\frac{1}{2}$, height of body $6\frac{1}{2}$ (8 ?) in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and a little more than $\frac{1}{2}$ apart. Height of head equals $\frac{4}{9}$ to $\frac{2}{5}$ of its length. A slight fleshy knob at end of lower jaw. Preopercle nearly rectangular, angle a little produced, the opercle terminates in a single flat membranous point. *Teeth*—about 20 on either ramus of lower jaw, the 9 or 10 posterior ones being the largest, with an anterior central fang; one or two large fangs anteriorly

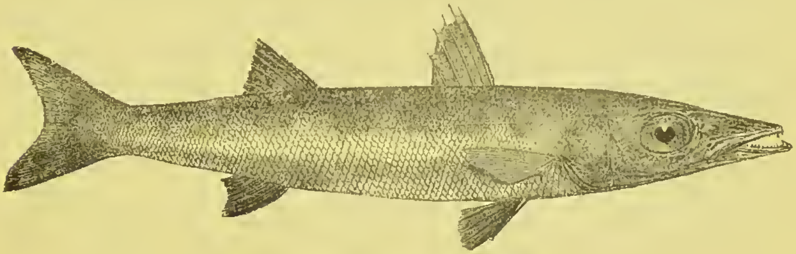

Fig. 112.—*Sphyræna obtusata.*

in upper jaw; and three large fangs in front of palatines, followed by a single row of small teeth. *Fins*—first dorsal arises over last fourth of pectoral and a little behind ventral. Caudal not so deeply lobed as in *S. jello*, central rays being $\frac{1}{2}$ length of longest outer ones or less. *Scales*—extended over opercles and cheeks. *Colour*—greyish green above, whitish along abdomen, the grey descending in a festooned edge below the lateral line. Pectorals greyish, the other fins yellowish.

Hab. Seas of India to the Malay Archipelago and Australia.

Family XXXV. ATHERINIDÆ.

Branchiostegals five or six; pseudobranchiæ. Four gills; gill-opening wide. Body more or less elongate and somewhat subcylindrical. Eyes lateral. Gape of mouth of moderate width; cleft not very deep. Teeth minute. Two dorsal fins, the spines of the first feeble, and less in number than the rays of the second, which is similar to the anal; ventrals abdominal, 1/5. Scales of

medium size, cycloid. Lateral line indistinct. Pyloric appendages, if present, few. Air-bladder present. Vertebræ numerous.

Geographical Distribution. Nearly all seas of temperate and tropical regions, also estuaries and tidal rivers not far from the sea.

Uses. Although so small, being rarely 3 inches in length, these fishes are dried in the sun and exported to distant markets.

1. Genus **ATHERINA**, Linn.

Body slightly compressed. Snout obtuse; cleft of the mouth oblique, extending at least to below the anterior edge of the orbit. Teeth very minute, but usually present on jaws, palate, and tongue. Ventrals some distance posterior to the pectorals. Scales of moderate size. Air-bladder present. Pyloric appendages, when present, few. Ova comparatively very large. A silvery lateral band.

Synopsis of Indian Species.

A. Teeth on palate.
- A. 1/14–15. L. l. 42–45 .... 1. *A. pinguis*, p. 338.
- A. 1/13–14. L. l. 40 .... 2. *A. forskalii*, p. 338.
- A. 1/11. L. l. 35 .... 3. *A. duodecimalis*, p. 339.

B. No palatine teeth.
- D. 5 | 1/10. A. 1/13. L. l. 37 .... 4. *A. melanostigma*, p. 339.

1165. (1.) Atherina pinguis.

Atherina pinguis, *Lacép. H. N. Poiss.* v, p. 373, pl. xi, fig. 1; *Day, Fish. India*, p. 344 (see synon.).

D. 5–6 | 1/10. P. 16. A. 1/14–15. L. l. 42–45. L. tr. 7. Vert. 20/23.

Length of head $4\frac{1}{3}$ to $4\frac{2}{3}$, height of body $5\frac{2}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Upper jaw overlapping lower. Posterior end of opercle midway between snout and base of first dorsal. *Colour*—the silvery lateral band includes the whole third and upper quarter of fourth row of scales; a blackish mark on upper edge of eye, also on posterior end of pectoral and caudal fins.

Hab. East coast of Africa, seas of India, Malay Archipelago, and Australia; attaining at least $5\frac{1}{2}$ inches in length.

1166. (2.) Atherina forskalii. (Fig. 113.)

Atherina forskalii, *Rüpp. N. W., Fische*, p. 132, t. 33, fig. 1; *Day, Fish. India*, p. 345, pl. lxxi, fig. 4 (see synon.).

Mottechi, Motti kola kende, Tamil; *Ko-re-dah*, Andam.

D. 5–6 | 1/9–10. P. 17. A. 1/13–14. C. 15. L. l. 40. L. tr. 6–7.

Length of head $4\frac{1}{3}$, height of body 6 to $6\frac{1}{3}$ in the total length.

Eyes—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{3}$ diam. from end of snout, and 1 apart. Cleft of mouth oblique; jaws of about equal length anteriorly, or the lower slightly the longer. Two or three large pores open along upper margin of opercle. *Fins*—first dorsal commences rather nearer the base of the anal than that of the

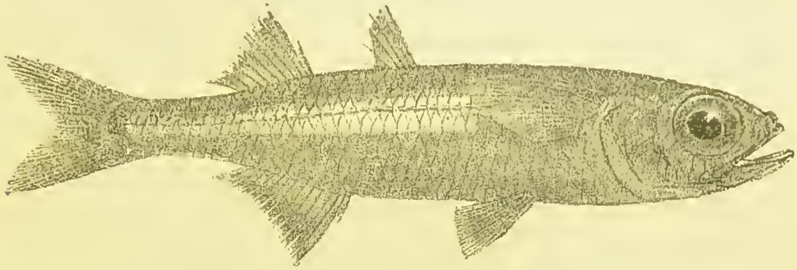

Fig. 113.—*Atherina forskalii.*

ventral. Pectoral inserted above the centre of depth of body; caudal rather deeply lobed. *Colour*—silvery, upper surface of head and back pale sea-green, with numerous fine black points; the silvery lateral band includes the whole third and upper half of fourth row of scales; cheeks and opercles silvery; muzzle and lips blackish; edges of dorsal, pectoral, and caudal with fine black spots.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago. This fish is only a few inches in length, and is most commonly captured on the shores of India during the cold season.

1167. (3.) Atherina duodecimalis.

Atherina duodecimalis, *Cuv. & Val. H. N. Poiss.* x, p. 458; *Day, Fish. India,* p. 345 (see synon.).

B. vi. D. 5 | 1/9. P. 15. A. 1/11. C. 17. L. l. 35.

Length of head 4 to $4\frac{1}{4}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 2 in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{3}{4}$ apart. Maxilla extends to below middle of orbit. *Fins*—first dorsal commences midway between base of ventral and anal; caudal forked, lower lobe the longer. *Colour*—silvery, a silver band along third row of scales, and a green band above it; no black dots on body; dorsal and caudal fins greyish.

Hab. Ceylon and Malay Archipelago; growing to at least $3\frac{1}{2}$ inches.

1168. (4.) Atherina melanostigma.

Atherina melanostigma, *Day, Fish. India,* p. 345.

B. vi. D. 5 | 1/10. P. 15. A. 1/13. C. 17. L. l. 37. L. tr. 7.

Length of head $4\frac{1}{3}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*

—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Cleft of mouth very oblique; lower jaw rather broad anteriorly and a little shorter than the upper. *Teeth*—in jaws minute, none on vomer or palate. *Fins*—dorsal spines feeble, the fin commences midway between bases of ventral and anal. *Scales*—edges a little rough. *Colour*—a well-marked silvery band is confined to third row of scales; many fine black dots along the back, especially on edges of scales, and a few in lower half of the body. Base of pectoral densely dotted with black. A dark spot on upper edge of eye, another at upper edge of base of caudal fin, which is also dark-edged posteriorly. A dark line along scales at base of anal fin.

Hab. Madras; growing to 3 inches in length.

Family XXXVI. MUGILIDÆ.

Branchiostegals from four to six; pseudobranchiæ. Gill-openings wide; gills four. Body oblong, compressed; the head and anterior portion may be depressed. Eyes lateral, with or without adipose lids. Mouth narrow or of moderate width. Opercles usually unarmed. Teeth very fine, sometimes absent. Two dorsal fins, the first consisting of four stiff spines; anal slightly longer than the second dorsal; ventrals abdominal and suspended from an elongated shoulder-bone, 1/5. Scales cycloid, rarely ctenoid. Lateral line absent. Pyloric appendages generally few. Vertebræ 24.

In marine mullets the scales are usually cycloid or very feebly ctenoid, but in *M. corsula*, *M. cascasia*, and *M. hamiltonii*, which reside mostly or entirely in fresh water, the scales are strongly ctenoid; the last two have only two cæcal appendages.

These fishes are distributed throughout the seas of India, some ascending tidal rivers or being found in estuaries. The young, as a rule, enter large rivers, and are found in the watercourses intersecting paddy-fields, and in inundated localities. Large numbers are captured by means of small-meshed nets and wicker-baskets. The strictly fresh water forms seem to be confined to the larger rivers, as the Ganges, Jumna, and Irrawaddy.

As a rule these fishes, when of sufficient size, are esteemed as food by both Europeans and natives in their fresh state; they are also extensively salted and sun-dried.

Mullets putrefy very rapidly in hot climates, especially if large.

1. Genus **MUGIL**, Linn.

Branchiostegals six in all Indian species. Eyes with or without an adipose lid. Mouth more or less transverse, with a shallow cleft, and the anterior edge of the mandible sharp. Upper portion of the stomach very muscular.

Geographical Distribution. Temperate and tropical seas, estuaries and some rivers.

Synopsis of Indian Species.

A. Well-developed adipose eyelids.
- *a.* Anal commences before vertical from origin of second dorsal. L. tr. not exceeding 13.
  - *a'.* Anal not more than $\frac{1}{4}$ before second dorsal.
    - *a''.* L. l. 40–42; a long axillary scale. 1. *M. speigleri*, p. 342.
    - *b''.* L. l. 30–38.
      - *α.* A long axillary scale.......... 2. *M. cunnesius*, p. 342.
      - *β.* No long axillary scale.
        - Eyes $\frac{4}{17}$ length of head; head, dorsal, and caudal fins with fine black spots. Base of pectoral dark. L. tr. 11...... 3. *M. klunzingeri*, p. 343.
        - Eyes $\frac{1}{4}$ length of head; golden around eye. L. tr. 12–13 .... 4. *M. carinatus*, p. 344.
        - Eyes $\frac{2}{13}$ to $\frac{1}{7}$ length of head; a dark line along each row of scales. L. tr. 11 .... 5. *M. tade*, p. 344.
        - Eyes $\frac{2}{7}$ length of head; a golden spot on opercle. L. tr. 11–12 . 6. *M. parsia*, p. 344.
        - Eyes $\frac{2}{9}$ length of head; silvery, no marks. L. tr. 10............ 7. *M. belanak*, p. 345.
        - Eyes about $\frac{2}{7}$ length of head; scales with black central spots. L. tr. 10–11 .... 8. *M. pœcilus*, p. 345.
  - *b'.* Anal $\frac{1}{3}$ before second dorsal. L. tr. 10. A long axillary scale. Upper profile of head convex................... 9. *M. kelaartii*, p. 346.
  - *c'.* Anal $\frac{1}{2}$ before second dorsal.
    - *a''.* Teeth in upper jaw only.
      - Eye $\frac{2}{7}$ length of head, $\frac{1}{2}$ diam. from end of snout. L. tr. 10 . . 10. *M. jerdoni*, p. 346.
      - Eye about $\frac{1}{4}$ length of head, $\frac{3}{4}$ to 1 diam. from end of snout. L. tr. 11 .... 11. *M. dussumieri*, p. 347.
    - *b''.* No teeth. L. tr. 11 .... 12. *M. subviridis*, p. 348.
- *b.* Anal commences opposite second dorsal. L. tr. 14 .... 13. *M. oeur*, p. 348.

B. No adipose eyelids.
- *a.* L. tr. more than 12.
  - *a'.* L. tr. 15. Eyes small, elevated above interorbital area .... 14. *M. corsula*, p. 349.
  - *b'.* Eyes moderate, not elevated.
    - *a''.* Anal commences before origin of second dorsal.
      - L. tr. 18. Opercle with a spine. . 15. *M. hamiltonii*, p. 349.
      - L. tr. 13–14 .... 16. *M. seheli*, p. 350.
    - *b''.* Anal commences opposite origin of second dorsal.
      - L. tr. 13. Lips thick, crenulated. 17. *M. crenilabris*, p. 350.
      - L. tr. 16–18. Opercle with a spine. 18. *M. cascasia*, p. 351.

b. L. tr. 11–12.
- *a'*. Eyes 2 diameters apart. Anal commences opposite second dorsal .... 19. *M. cæruleo-maculatus*, [p. 351.
- *b'*. Eyes less than 2 diameters apart.
  - Anal commences slightly before second dorsal .... 20. *M. amarulus*, p. 352.
  - Anal commences $\frac{1}{2}$ before second dorsal; lips thick, crenulated.... 21. *M. labiosus*, p. 352.
  - Anal commences $\frac{1}{3}$ before second dorsal; mandibles meet at a rather acute angle .... 22. *M. borneensis*, p. 353.
  - Anal commences $\frac{3}{4}$ before second dorsal...................... 23. *M. olivaceus*, p. 354.
  - Anal commences opposite second dorsal.................. .... 24. *M. buchanani*, p. 354.
  - Anal commences $\frac{1}{3}$ to $\frac{1}{2}$ before second dorsal; mandibles meet at an obtuse angle .... 25. *M. troschelii*, p. 355.

c. L. tr. 10. First dorsal spine longest .. 26. *M. oligolepis*, p. 355.
d. L. tr. 9. Second dorsal spine longest.. 27. *M. waigiensis*, p. 356.

1169. (1.) Mugil speigleri.

Mugil speigleri, *Bleeker, Batavia Nat. Tijdsch.* xvi, p. 279; *Day, Fish. India*, p. 348, pl. lxxiv, fig. 1 (see synon.).

Mángin, Maráthi.

D. 4 | 1/8. P. 16. A. 3/9. C. 14. L. l. 40–42. L. tr. 11–12. Cæc. pyl. 6.

Length of head $4\frac{2}{3}$ to 5, height of body $4\frac{3}{5}$ to 5 in the total length. *Eye*—with a broad posterior and a moderately wide anterior adipose lid; diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{3}{4}$ apart. Interorbital space rather convex. Preorbital scaled, curved; end of maxilla uncovered. Uncovered space below the chin long, narrow, and pointed. A deep transverse groove before the vomer. *Teeth*—a few minute ones in the lower jaw. *Fins*—dorsal spines weak, first strongest, half length of head, not quite so high as second dorsal, which is emarginate, its base nearly as long as its height; first and second dorsals arise above 12th and 25th scales of lateral line. Pectoral situated above the centre of the depth of the body. Anal rather higher than second dorsal, its anterior fourth is vertically before that fin, its lower edge concave, third anal spine $\frac{1}{3}$ length of head. Caudal lunate. *Scales*—cycloid, rounded posteriorly, many fine ones over soft dorsal, anal, and basal half of caudal fins. A long, pointed axillary scale, one also at first dorsal and ventral. *Colour*—greyish along back, silvery in lower two thirds of body, sides of head golden; tips of both dorsals blackish, extremity of caudal grey; a dark spot at upper edge of base of pectoral.

Hab. Seas of India to the Malay Archipelago.

1170. (2.) Mugil cunnesius.

Mugil cunnesius, *Cuv. & Val. H. N. Poiss.* xi, p. 114; *Day, Fish. India*, p. 349, pl. lxxiv, fig. 3 (see synon.).

Kunnesee, Tel.; *Nga nantha*, Arracan.

D. 4 | 1/8. P. 16. A. 3/9. C. 14. L. l. 33–35. L. tr. 12.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eye*—with a broad posterior adipose lid, a narrow anterior one; diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Preorbital bent; end of maxilla entirely concealed or just visible. Uncovered space below the chin narrow and lanceolate. *Teeth*—minute in both jaws. *Fins*—dorsal spines moderately strong, as long as head behind middle of eyes, but not quite so high as second dorsal; the 10th and 20th scales of lateral line correspond with the origins of the two dorsals. Pectoral arises above middle of depth of the body. Anal commences in advance of second dorsal, the two fins equally high; third anal spine nearly half as long as head. Caudal lunate. *Scales*—18 rows between snout and base of first dorsal. Scales on preorbital, second dorsal, anal, and caudal fins; an elongate axillary scale well developed. *Colour*—silvery, darkest above, with a dark spot in the axilla.

Hab. Red Sea, seas of India to the Malay Archipelago and beyond; attaining a large size.

1171. (3.) Mugil klunzingeri.

Mugil carinatus, *Day, Fish. India,* p. 349, pl. lxxiv, fig. 2 (*not C. & V.*).

Mugil klunzingeri, *Day, P. Z. S.* 1888, p. 264; *Fish. India, Suppl.* p. 800.

D. 4 | 1/8. P. 15. A. 3/9. C. 14. L. l. 34–36. L. tr. 11.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 5 to $5\frac{1}{4}$ in the total length. *Eye*—with a broad posterior adipose lid, and a narrower anterior one; diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart; interorbital space nearly flat. Preorbital scaleless, moderately bent; end of maxilla uncovered. The origin of a large gland below each ramus of lower jaw; uncovered space below chin of moderate width, rather rounded anteriorly and pointed posteriorly. Upper lip rather thick. A transverse groove before vomer. *Teeth*—distinct in upper jaw, none in lower. *Fins*—dorsal spines weak, the first equals length of head behind eye, and is one third higher than second dorsal fin, which is emarginate and one third higher than long at base. First and second dorsal fins arise above 9th and 21st scales of lateral line. Anal as high as spinous dorsal and $\frac{1}{3}$ higher than long, it commences slightly before second dorsal; third anal spine $\frac{2}{7}$ length of head. Caudal lunate. *Scales*—24 or 25 rows between first dorsal and snout; some fine scales over front portion of soft dorsal and anal, no enlarged one in axilla. Scales from base of first dorsal to occiput form a sort of keeled ridge. *Colour*—greyish above, silvery on sides and below, cheeks golden; numerous fine black spots on head, both dorsal and caudal fins, base of pectoral also with some spots.

Hab. Red Sea and seas of India.

1172. (4.) Mugil carinatus.

Mugil carinatus (*Ehr.*), *Cuv. & Val. H. N. Poiss.* xi, p. 148; *Day, Fish. India, Suppl.* p. 800.

D. 4 | 1/8. P. 14. A. 3/9. C. 15. L. l. 38. L. tr. 12–13.

Length of head from $4\frac{1}{4}$ to $4\frac{1}{2}$, of caudal fin $4\frac{1}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—with narrow posterior adipose lids; diameter 4 in length of head, nearly 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space flat. Upper lip rather thick; preorbital not scaled, moderately curved and serrated; end of maxilla visible; uncovered space on chin broadly lanceolate. *Fins*—first dorsal higher than second, height of the first spine equal to width of head; the fin commences above 10th scale of lateral line, second dorsal above 21st; pectoral reaches 11th. Soft dorsal and anal fins scaled, latter commencing very slightly in advance of former. *Scales*—no elongate one in axil, one along base of the first dorsal, another along ventral; scales on back in front of first dorsal form a keel for some little distance. *Colour*—golden around the eye, no black pectoral spot.

Hab. Red Sea and seas of India.

1173. (5.) Mugil tade.

Mugil tade, *Forsk.* p. 74; *Day, Fish. India, Suppl.* p. 800 (see synon.).
Mugil planiceps, *Cuv. & Val.* xi, p. 122; *Day, Fish. India*, p. 350.

Bangon, Beng.

D. 4 | 1/8. P. 17. A. 3/9. C. 17. L. l. 33–35. L. tr. 11. Cæc. pyl. 5.

Length of head $4\frac{1}{2}$ to 5, height of body $5\frac{1}{2}$ to 6 in the total length. *Eye*—with a wide posterior adipose lid and a narrow anterior one; diameter $6\frac{1}{2}$ to 7 in length of head, $1\frac{1}{2}$ diam. from end of snout, and nearly 3 apart. Interorbital space flat. End of maxilla not hidden by preorbital, which is bent but not notched. Uncovered space on chin long, cuneiform above, pointed behind. *Teeth*—in upper jaw minute. *Fins*—height of dorsal spines $\frac{2}{3}$ that of body, and equal to height of second dorsal; the tenth and twenty-first scales of lateral line correspond to origin of first and second dorsals. Pectoral extends to eighth scale of lateral line, its root is in middle of depth of body. First three anal rays vertically before second dorsal. Caudal emarginate. *Scales*—no enlarged axillary; small scales present on vertical fins. *Colour*—greenish brown above, with a dark line along each row of scales.

Hab. Seas, estuaries, and tidal rivers of India to the Malay Archipelago and China; attaining at least 18 inches in length. Common in the Hooghly at Calcutta.

1174. (6.) Mugil parsia.

Mugil parsia, *Ham. Buch. Fish. Ganges*, pp. 215, 380, pl. xvii, fig. 71; *Day, Fish. India*, p. 350, pl. lxxv, fig. 2 (see synon.).

Tarui, Beng.

D. 4 | 1/8. P. 14. A. 3/8–9. C. 14. L. l. 34–35. L. tr. 11–12. C. p. 5.

Length of head 5 to $5\frac{1}{4}$, height of body $4\frac{1}{3}$ to $4\frac{1}{2}$ in the total length. *Eye*—with a well-developed posterior adipose lid; diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Upper surface of head slightly convex, snout rather depressed, upper lip thin. Preorbital bent, not notched, serrated, not quite concealing end of maxilla. Mandibular angle somewhat obtuse. Uncovered space on chin very narrow, lanceolate. A shallow groove before vomer. *Teeth*—in upper jaw. *Fins*—first two dorsal spines about equal length of head behind posterior third of orbit. Second dorsal $\frac{1}{3}$ higher than its base is long, origin a little posterior to that of anal. First and second dorsals arise about 11th and 22nd scales of lateral line respectively. Pectoral reaching to 11th or 12th scale of lateral line; third anal spine $\frac{3}{7}$ length of head. *Scales*—each with distinct longitudinal lines, rather angular and slightly ctenoid. No elongate axillary scale; some fine scales over second dorsal and anal. *Colour*—a golden spot on upper portion of opercle, a narrow dark edge to both dorsal fins, most distinct in second; caudal with a yellowish base and dark extremity.

Hab. Seas and estuaries of India; attaining 5 or 6 inches in length.

1175. (7.) Mugil belanak.

Mugil belanak, *Bleeker*, *Batavia Nat. Tijdsch.* xiii, p. 337; *Day*, *Fish. India*, p. 351, pl. lxxiv, fig. 5 (see synon.).

D. 4 | 1/8. P. 15. A. 3/9. C. 16. L. l. 34–35. L. tr. 10.

Length of head $5\frac{1}{4}$, height of body $5\frac{1}{2}$ in the total length. *Eye*—with a broad posterior eyelid; diameter $4\frac{1}{2}$ in length of head, 1 diam. from end of snout, and 2 apart. Interorbital space slightly convex. Preorbital deeply notched, serrated both inferiorly and posteriorly; end of maxilla uncovered. Uncovered space at chin rapidly narrowing posteriorly, rounded anteriorly. A groove before vomer. *Teeth*—distinct in upper jaw. *Fins*—dorsal spines strong, second spine longest and equal to half height of body, but $\frac{1}{4}$ shorter than height of second dorsal, which commences slightly behind origin of anal, both densely scaled. First and second dorsals arise respectively above 11th and 20th scales of lateral line. Third anal spine $\frac{1}{3}$ length of head. *Scales*—no enlarged axillary scale. *Colour*—silvery, darkest along the back.

Hab. Seas of India to the Malay Archipelogo.

1176. (8.) Mugil pœcilus.

Mugil poicilus, *Day*, *Fish. Malabar*, p. 140, pl. ix; *Fish. India*, p. 351, pl. lxxv, fig. 4 (see synon.).

D. 4 | 1/8. P. 15. A. 3/9. C. 14. L. l. 30–33. L. tr. 10–11. C. p. 5.

Length of head $4\frac{3}{4}$ to 5, height of body 5 in the total length. *Eye*—with a moderately broad posterior adipose lid and a narrow anterior one; diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{2}$ to $1\frac{3}{4}$ apart. Interorbital space nearly flat. Extremity of maxilla not concealed by preorbital, which is scaled, angularly bent and serrated. Uncovered space on chin elongate and tongue-shaped. A transverse groove in front of vomer. *Teeth*—small in both jaws. *Fins*—first dorsal spine as long as head behind eyes, and $\frac{1}{8}$ higher than rays of second dorsal. Second dorsal commences slightly behind origin of anal, and is one third higher than long. First dorsal begins above 10th, second above 20th scale of lateral line. Caudal emarginate. *Scales*—slightly ctenoid, no elongate one in the axilla, or along the base of first dorsal; fine ones over second dorsal, anal, and caudal fins. *Colour*—greyish, shot with purple and silver, becoming lighter on sides and below, each scale has usually a deep central black spot; fins stained with grey.

Hab. Bombay and western coast of India, more especially in the cold months; attaining at least 2 feet in length.

1177. (9.) Mugil kelaartii.

Mugil kelaartii, *Günther, Catal.* iii, p. 429; *Day, Fish. India,* p. 352, pl. lxxv, fig. 1.

Bhádavi, Maráthi.

D. 4 | 1/8. P. 15. A. 3/9. C. 17. L. l. 33. L. tr. 10.

Length of head $4\frac{1}{2}$ to 5, height of body $4\frac{1}{2}$ to 5 in the total length. *Eye*—with narrow posterior and anterior adipose lids; diameter 4 in length of head, nearly 1 diam. from end of snout, and $1\frac{2}{3}$ apart. Interorbital space convex. Profile from occiput to snout rather convex. Preorbital bent, having a slight notch, serrated inferiorly and posteriorly, and leaving the extremity of the bent maxilla visible. Uncovered portion of chin long, narrow, lanceolate, and constricted on either side about its middle. A shallow groove before vomer. *Teeth*—minute in the upper jaw. *Fins*—dorsal spines of moderate strength, longest $\frac{3}{5}$ length of head, and nearly as high as second dorsal; base of second dorsal equals $\frac{2}{3}$ height. Origin of first and second dorsals above 10th and 20th scales of lateral line respectively. Pectoral inserted above middle of depth of body. Anal has its anterior $\frac{1}{3}$ in advance of origin of second dorsal. Caudal emarginate. *Scales*—an elongate pointed one in the axilla; second dorsal, anal, and caudal densely scaled. *Colour*—silvery, becoming lighter on sides and beneath, a darkish spot in axilla; tips of dorsals and caudal dark.

Hab. Seas of India, Philippines.

1178. (10.) Mugil jerdoni.

Mugil jerdoni, *Day, Fish. India,* p. 352 (see synon.).

D. 4 | 1/8. P. 16. A. 3/9. C. 15. L. l. 31–32. L. tr. 10.

Length of head 5 to $5\frac{1}{2}$, height of body 5 in the total length. *Eye*—with a broad posterior and narrow anterior adipose lid; diameter $3\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space slightly convex. Preorbital strongly bent and serrated, leaving the end of the bent maxilla visible. Uncovered space at chin narrow, rounded anteriorly, pointed posteriorly. A slight groove in front of vomer. *Teeth*—distinct in upper jaw. *Fins*—dorsal spines stout, longest $\frac{2}{3}$ height of body, and slightly higher than second dorsal. First and second dorsal arise over 10th and 19th scales of lateral line respectively. Pectoral inserted above middle of depth of body. Anal of same height as second dorsal, its anterior $\frac{1}{2}$ is before the origin of that fin; third anal spine $\frac{3}{7}$ to $\frac{2}{5}$ length of head. *Scales*—no elongate axillary scale; second dorsal, anal, and caudal densely scaled. *Colour*—steel-blue along back, silvery white on sides and below; cheeks tinged yellow, a black spot over centre of eye. Both dorsals with their extremities rather stained with grey, caudal and pectoral dark-edged; sometimes a diffused dark-bluish spot on opercle; ventrals and anal white.

Hab. Seas of India; growing to at least 6 inches in length.

1179. (11.) Mugil dussumieri.

Mugil dussumieri, *Cuv. & Val. H. N. Poiss.* xi, p. 147; *Day, Fish. India*, p. 352, pl. lxxiv, fig. 4 (see synon.).

Korul, Chittagong; *Nga-kam-byen,* Arracanese; *Nga-kaboolee,* Burmese.

D. 4 | 1/8. P. 16. A. 3/9. C. 15. L. l. 29–31. L. tr. 11.

Length of head 5 to $5\frac{1}{4}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—with a broad posterior and narrow anterior adipose lid; diameter 4 to $4\frac{1}{4}$ in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and 2 apart. The profile from first dorsal to the snout nearly straight. Preorbital scaled, bent, emarginate, and denticulated both below and behind; end of maxilla not concealed. The uncovered space on the chin is lanceolate. *Teeth*—distinct in upper jaw. *Fins*—dorsal spines strong, the first the longest, equalling length of head behind middle of eye, and rather higher than second dorsal. The two dorsals arise above 9th and 20th scales of lateral line. Pectoral inserted above middle of body, and reaching to seventh scale of lateral line. Half of anal vertically before commencement of second dorsal; third anal spine $\frac{3}{8}$ length of head. Caudal emarginate. *Scales*—no enlarged elongate one in the axilla, but one at base of first dorsal and ventral fins; second dorsal, anal, and caudal densely scaled. *Colour*—dull greenish above, becoming lighter on sides and beneath; outer edge of caudal dark.

Hab. Seas of India, entering fresh water.

1180. (12.) Mugil subviridis.

Mugil subviridis, *Cuv. & Val. H. N. Poiss.* xi, p. 115; *Day, Fish. India,* p. 353.

D. 4 | 1/8. P. 16. A. 3/9. C. 15. L. l. 30. L. tr. 11.

Length of head 5, of caudal fin $6\frac{1}{2}$, height of body $4\frac{3}{4}$ in the total length. *Eyes*—with a broad posterior and narrow anterior adipose lid; diameter of eye 4 in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{3}{4}$ apart. Preorbital strongly bent and serrated, end of maxilla visible. Uncovered space below chin narrow and lanceolate. *Teeth*—absent. *Fins*—10th and 20th scales of lateral line correspond to origins of first and second dorsals. Pectoral reaches to seventh scale of lateral line. *Scales*—exposed portion angular. Second dorsal and anal densely scaled. No elongate axillary scale. *Colour*—as in *M. dussumieri*.

Hab. The type specimen of Cuvier and Valenciennes described above was from the Ganges.

1181. (13.) Mugil oeur. (Fig. 114.)

Mugil öûr, *Forsk. Descr. Anim.* p. 74, no. 109 c.
Mugil oeur, *Day, Fish. India,* p. 353, pl. lxxv, fig. 3, *Suppl.* p. 800 (see synon.).

D. 4 | 1/8. P. 15. A. 3/8. C. 15. L. l. 42–44. L. tr. 14.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $5\frac{1}{3}$ to $5\frac{2}{3}$ in the total length. *Eyes*—with broad anterior and posterior adipose lids, both reaching pupil; diameter $4\frac{2}{3}$ in length of head, 1 diam. from end of snout, and $2\frac{1}{3}$ apart. Interorbital space flat; dorsal profile from snout to base of first dorsal nearly straight. Upper lip thin. Mandibles have two small open glands beneath. Uncovered space on chin rather broad and rounded anteriorly, narrow and lanceolate pos-

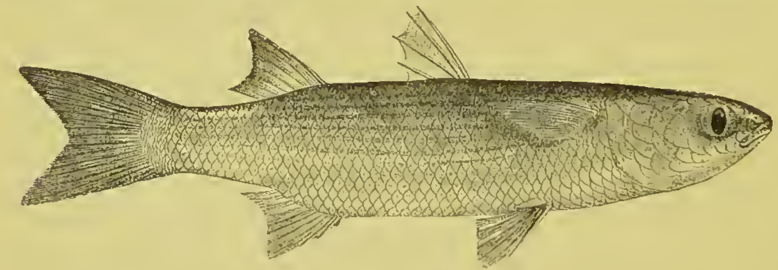

Fig. 114.—*Mugil oeur.*

teriorly. *Teeth*—distinct in both jaws. *Fins*—the first and second dorsal fins commence above the 12th and 25th scales of lateral line; first dorsal spine as long as head behind eye, slightly exceeding height of second dorsal. Pectoral situated above middle of body and extending to 11th scale of lateral line. Anal arises opposite second dorsal and is of equal height, but its base is slightly longer; both

fins emarginate. Caudal with pointed lobes. *Scales*—rounded, a rather large pointed axillary one and another along base of first dorsal; few or none on second dorsal and anal. *Colour*—greyish along back, silvery on sides and beneath, a dark line along each row of scales in upper half of body. Cheeks golden. Pectoral fin with an oblique deep blue band across the base, outer third dark with a light margin. Second dorsal and caudal grey; anal yellowish with a dark mark along its centre, and a light edge. Some specimens have a black edge to caudal fin.

Hab. Red Sea, seas of India to China and Japan; attaining at least 3 feet in length.

1182. (14.) **Mugil corsula.**

Mugil corsula, *Ham. Buch. Fish. Ganges*, pp. 221, 381, pl. ix, fig. 97; *Day, Fish. India*, p. 354, pl. lxxi, fig. 6 (see synon.).

Kakunda, Ooriah; *Hurd-wah-re*, Punj.; *Corsula* and *In-ge-lee*, Beng.; *Undala*, Hind.; *Nga-sheng*, Burmese.

D. 4. | 1/7–8. A. 3/9. C. 15. L. l. 48–52. L. tr. 15. Cæc. pyl. 2.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—without adipose lids, elevated, their upper margin being above the level of the flat, interorbital space; diameter 7 in length of head, 1 diam. from end of snout, and 1 to $1\frac{1}{2}$ apart. Head depressed, dorsal profile nearly straight; upper jaw the longer and overhung by snout. Upper lip thick. *Teeth*—a single row in either jaw. *Fins*—first dorsal commences above 16th scale of lateral line, second above 34th; spines about $\frac{1}{2}$ as long as head excluding the snout; first seven anal rays anterior to second dorsal. Caudal slightly emarginate. *Scales*—finely ctenoid, a slightly raised line along middle of each; a few on second dorsal, anal, and caudal fins. No elongate axillary scale. *Colour*—dull brown superiorly, lighter along abdomen; dorsal and caudal fins stained with grey. Eyes golden. Peritoneum black.

These fish swim with their eyes just above the surface of the water, giving the appearance of a number of tadpoles. Immediately they are disturbed they dive down with great rapidity.

Hab. Rivers and estuaries of Bengal and Burma, found far above tidal influence in fresh water; attaining 18 inches or more in length, and excellent eating.

1183. (15.) **Mugil hamiltonii.**

Mugil hamiltonii, *Day, P. Z. S.* 1869, p. 614; *Fish. India*, p. 354, pl. lxxv, fig. 5.

D. 4 | 1/8. P. 13. A. 3/9. C. 15. L. l. 44. L. tr. 18.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ to 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{3}$ apart. Interorbital space slightly convex; preorbital not notched but strongly denticulated.

Uncovered space on chin very narrow and lanceolate. Opercle with a strong spine. *Teeth*—none visible. *Fins*—first dorsal arises above 17th scale of lateral line, longest spine equals length of head behind middle of eye; second dorsal as high as first, it commences over anterior third of anal. Caudal rather deeply lunate. *Scales*—strongly ctenoid, with a raised line along each, no enlarged one in axilla; 34 rows between snout and base of first dorsal, a few on vertical fins. *Colour*—silvery, shot with gold, leaden along upper half of body.

Hab. Rivers of Burma; attaining to about $4\frac{1}{2}$ inches in length.

1184. (16.) Mugil seheli.

Mugil seheli, *Forsk. Descr. Anim.* p. 73, no. 109 b; *Day, Fish. India*, p. 355 (see synon.).

Magi, Ooriah.

D. 4 | 1/8. P. 15. A. 3/9. C. 16. L. l. 42–43. L. tr. 13–14.

Length of head $4\frac{2}{3}$ to 5 ($6\frac{1}{5}$), height of body $4\frac{2}{3}$ to $5\frac{1}{2}$ in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. *Fins*—first dorsal not quite so high as second, which is a little lower than anal. The two dorsals commence over 12th and 24th scales of lat. line. Anal commences slightly before second dorsal. Caudal emarginate. *Scales*—21 or 22 between snout and base of first dorsal; soft dorsal and anal scaly. A long axillary scale. *Colour*—silvery, bluish-green tinge along head and back; a black mark in axilla. Ventrals white.

Hab. From Red Sea through seas of India to the Malay Archipelago; attaining at least a foot in length.

1185. (17.) Mugil crenilabris.

Mugil crenilabris, *Forsk. Descr. Anim.* p. 73, no. 109; *Day, Fish. India*, p. 355, *Suppl.* p. 800 (see synon.).

D. 4 | 1/8. P. 17. A. 3/9. C. 16. L. l. 41. L. tr. 13.

Length of head $4\frac{2}{3}$ to 5, height of body $4\frac{2}{3}$ to 5 in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{3}{4}$ apart. Profile from upper edge of snout to base of first dorsal nearly straight: snout obtuse, projecting beyond mouth. Upper lip very thick, forming the end of the snout, and having about five rows of soft tubercles along its lower fourth, the inferior branched at their extremities; lower lip thick, reflected, deficient opposite the notched symphysis, thickly studded with tubercles along its upper exposed surface. Free space beneath chin narrow. *Teeth*—none visible. *Fins*—first dorsal spines not strong, and $\frac{3}{4}$ height of second dorsal. The two dorsals arise above 13th and 24th scales of lat. line respectively. Pectoral reaches to fifteenth scale of lateral line and is inserted above middle of depth of body. Anal arises opposite second dorsal and is of same height.

Caudal deeply forked. *Scales*—second dorsal, anal, and base of caudal scaled. No enlarged axillary scale. *Colour*—greenish brown along back, dull white on sides and below. A black spot at upper base of pectoral.

Hab. Red Sea to the Andamans and Nicobars. I captured one specimen $4\frac{1}{2}$ inches in length at the Andamans.

1186. (18.) Mugil cascasia.

Mugil cascasia, *Ham. Buch. Fish. Ganges*, pp. 217, 380; *Day, Fish. India*, p. 355, pl. lxxv, fig. 6 (see synon.).

Cuck-se or *Buah*, Punj.

D. 4 | 1/8. A. 3/8–9. L. l. 36–39. L. tr. 16–18. C. p. 2 (short).

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ to $5\frac{1}{4}$ in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Head flat above; mandibular angle very obtuse. Upper lip placed obliquely so that it does not form part of front of snout. Preorbital large, slightly bent, serrated along lower margin and with three denticulations at posterior extremity. Opercle with a strong spine. Uncovered space on chin somewhat lanceolate. *Teeth*—minute, but present in both jaws. *Fins*—first dorsal begins above 7th scale of lateral line, second above 24th; sixteen scales between first dorsal and snout; second spine the longest, equalling length of head excluding snout and one third higher than second dorsal. Second dorsal arises opposite anal. Pectoral in middle of depth of body, and having a short, angular, somewhat large but not elongate axillary scale. Caudal lunate. *Scales*—very strongly ctenoid, a few over bases of vertical fins. *Colour*—yellowish olive along top of head, greyish on back and upper third of side, with many fine black dots; silvery white in lower two thirds. Uncovered space on chin, eyes, base of pectoral, and centre of base of caudal gamboge-yellow; cheeks silvery; fins uncoloured.

Hab. Upper waters of Ganges and Jumna, as low down as Patna; also in the Indus and Brahmapootra. This species does not appear to exceed 4 inches in length, and is considered very bad eating.

1187. (19.) Mugil cæruleo-maculatus.

Mugil cæruleo-maculatus, *Lacép. H. N. Poiss.* v, pp. 385, 389; *Day, Fish. India*, p. 356 (see synon.).

D. 4 | 1/8. P. 17. A. 3/9. C. 14. L. l. 38. L. tr. 12.

Length of head 5 to $5\frac{2}{3}$, height of body $4\frac{1}{4}$ to $4\frac{2}{3}$ in the total length. *Eyes*—without adipose lids; diameter 4 in length of head, nearly 1 diam. from end of snout, and 2 apart. Interorbital space slightly convex, its width about $\frac{1}{2}$ length of head. Upper lip thick, placed obliquely so that it does not form part of front end of snout. Preorbital not notched, serrated posteriorly; maxilla

hidden. Uncovered portion of chin very narrow; a deep groove across the palate in front of the vomer. *Teeth*—minute. *Fins*—first dorsal commences midway between the snout and base of caudal: spines stout, not quite so high as second dorsal, but equalling length of postorbital portion of head; second dorsal commences opposite anal, they are of equal height and scaled. First and second dorsal arise over 12th and 24th scales of lat. line respectively. Caudal lunate. *Scales*—cycloid. An elongate, pointed scale in the axilla. *Colour*—silvery, light on sides and beneath; a black spot at upper edge of base of pectoral.

Hab. Mauritius, and from Bombay through the seas of India to the Malay Archipelago. At the Andamans I have taken this fish up to 13 inches in length, but it is said to grow very much larger.

1188. (20.) Mugil amarulus.

Mugil amarulus, *Cuv. & Val. H. N. Poiss.* xi, p. 133; *Day, Fish. India*, p. 356.

D. 4 | 1/8. P. 16. A. 3/9. C. 15. L. l. 36. L. tr. 12.

Length of head $4\frac{1}{4}$, of caudal fin $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—without adipose lids; diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Preorbital strongly bent and serrated, end of maxilla visible; the mandibles form rather an obtuse angle, are notched at their point of junction, and have a distinct knob. Upper lip moderately thick, placed obliquely so as not to form end of snout. Uncovered space below the chin narrow, and constricted in its middle. A groove before vomer. *Teeth*—minute in lower jaw. *Fins*—dorsal spines weak, the fin commences midway between front edge of the eye and base of caudal fin, length of spines equals postorbital portion of head; second dorsal rather higher. First and second dorsals commence over 11th and 24th scales of lat. line respectively. Pectoral inserted above middle of body. Anal arises slightly in advance of second dorsal, than which it is rather higher. Caudal lunate. *Scales*—a short pointed one in axilla; 18 rows between the snout and base of first dorsal. Second dorsal and anal thickly scaled. *Colour*—bluish above, light on the sides and beneath, a dark spot at upper edge of base of pectoral; cheeks with a golden tinge; caudal with a dark outer edge.

Hab. Seas of India to Java.

1189. (21.) Mugil labiosus.

Mugil labiosus, *Cuv. & Val. H. N. Poiss.* xi, p. 125; *Day, Fish. India*, p. 357 (see synon.).

D. 4 | 1/8. P. 15. A. 3/9. C. 15. L. l. 36. L. tr. 11–12.

Length of head $4\frac{1}{2}$ to 5, of caudal fin $5\frac{1}{4}$, height of body $4\frac{1}{3}$ in the total length. *Eyes*—without adipose lids, diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space flat. Profile from snout to dorsal fin rather steep. Pre-

orbital with a very large and deep notch on its anterior surface; smooth except its posterior extremity, which is serrated; extremity of maxilla visible. Free space below chin long, narrow, lanceolate, and with a row of glands along either side. Upper lip forming end of snout, thick and fringed; lower lip also thick and fringed, except opposite symphysis; these fringes decrease with age. On lower surface of head is a triangular scaleless spot, the base formed by the lower jaw, the apex below middle of eyes. *Teeth*—absent. *Fins*—first dorsal commences midway between hind edge of eye and base of caudal fin and over 12th scale of lat. line, second over 24th scale; second dorsal rather lower than first, commencing over middle of anal. Pectoral reaches to eleventh scale. Caudal emarginate. *Scales*—cycloid, densely covering vertical fins; 22 rows between snout and base of first dorsal. *Colour*—dark grey above, dull white on sides and beneath; a dark black spot at base of pectoral.

Hab. Red Sea, seas of India and the Malay Archipelago. Specimens from $3\frac{1}{3}$ to $4\frac{3}{4}$ inches in length were taken at the Andamans. The fringes to the lips existing in my small specimen appear to be absent in adults.

1190. (22.) Mugil borneensis. (Fig. 115.)

Mugil borneensis, *Bleeker, Batavia Nat. Tijdsch.* ii, 1851, p. 201; *Day, Fish. India*, p. 357, pl. lxxvi, fig. 1 (see synon.).

D. 4 | 1/8. P.15. A. 3/9. C. 17. L. l. 33–34. L. tr. 10–11.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, of caudal fin 5, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{4}$ to 4 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Preorbital scaled, slightly emarginate, serrated inferiorly, posteriorly it is truncated and denticulated; extremity of maxilla visible.

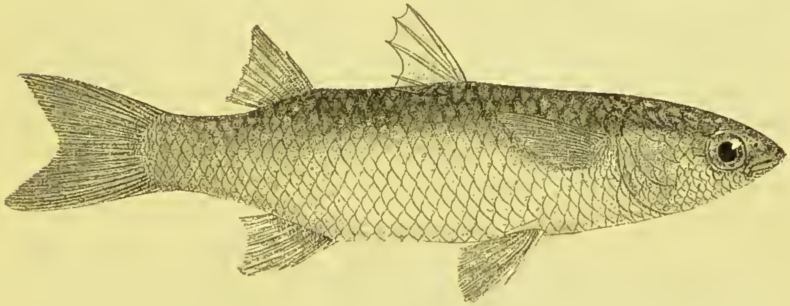

Fig. 115.—*Mugil borneensis.*

Upper lip moderately thick, forming part of anterior profile; lower lip not notched above symphysis but with a tubercle. The mandibles join at rather an acute angle; the uncovered space below the chin narrow and lanceolate. A groove before vomer. *Teeth*—fine ones in upper jaw. *Fins*—first dorsal commences midway

between front edge of eye and base of caudal fin and over 11th scale of lat. line, second over 23rd scale; first dorsal not quite so high as second, first spine strongest, as high as second and equal to length of head behind middle of eye. Height of second dorsal nearly double length of base. First third of anal anterior to second dorsal; two fins equally high, base of anal much longer (in some of Dr. Bleeker's specimens first two thirds of anal are anterior to origin of second dorsal). Caudal lunate. *Scales*—with their exposed portion rounded, 21 rows between snout and first dorsal. A short, scarcely pointed scale in axilla. Second dorsal and anal with fine scales. *Colour*—silvery, both dorsals and caudal with dark outer edges.

Hab. Seas of India, Calcutta to the Malay Archipelago.

1191. (23.) Mugil olivaceus.

Mugil olivaceus, *Day, Fish. India*, p. 357.

D. 4 | 1/8. A. 3/9. C. 17. L. l. 34. L. tr. 11. Cæc. pyl. 4.

Length of head $5\frac{1}{4}$, of caudal fin 5, height of body $4\frac{2}{3}$ in the total length. *Eyes*—without adipose lids; diameter 4 in length of head, nearly 1 diam. from end of snout, and $1\frac{3}{4}$ apart. Preorbital slightly emarginate, truncated posteriorly, and serrated; end of maxilla visible. Upper lip moderately thick and forming end of snout. Lower lip notched; a tubercle above symphysis of lower jaw. Uncovered space below chin rather narrow and lanceolate. No groove before vomer. *Teeth*—in upper jaw. *Fins*—first dorsal arising rather nearer base of caudal fin than end of snout, as high as second dorsal or as length of head behind middle of eyes; second dorsal about twice as high as its base is long. First and second dorsals arising over 11th and 22nd scales of lat. line respectively. Anal $\frac{3}{4}$ as long as high, with its first $\frac{3}{4}$ in advance of second dorsal, which it equals in height. Caudal emarginate. *Scales*—exposed portions forming half an irregular hexagon, 21 rows between snout and base of dorsal fin. Scales on second dorsal and anal. A short angular scale in axilla. *Colour*—olive along back, lighter on sides and beneath; a dull blotch in axilla; second dorsal and caudal dark externally, anal white.

Hab. Seas of India, ascending rivers.

1192. (24.) Mugil buchanani.

Mugil buchanani, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng. en Hind.* p. 99; *Day, Fish. India*, p. 358 (see synon.).

D. 4 | 1/8. P. 15. A. 3/9. C. 14. L. l. 32–35. L. tr. 11–12.

Length of head $4\frac{2}{3}$, of caudal fin $4\frac{1}{5}$, height of body $4\frac{2}{3}$ in the total length. *Eyes*—without adipose lids; diameter 4 in length of head, $\frac{3}{4}$ diam. from end of snout. Profile from dorsal fin to snout descends in a curve; interorbital space slightly convex. Snout obtuse; upper lip thin and forming end of snout. Preorbital with a slight notch, its extremity rounded and denticulated; end of

maxilla slightly or not at all concealed. The mandibles form an obtuse angle. Uncovered space below chin very narrow. *Fins*—first dorsal somewhat nearer base of caudal than end of snout, its spines equal length of postorbital portion of head and are one third shorter than rays; second dorsal twice as high as long, it and the anal arise opposite each other and are of equal height. First and second dorsals arise over 8th and 19th scales of lat. line respectively. Pectoral inserted above middle of body, it reaches ninth scale of lateral line. Caudal deeply forked. *Scales*—not angular, 19 rows between snout and base of first dorsal. Second dorsal and anal scaled. A short, pointed axillary scale. *Colour*—greenish above, silvery on sides and beneath, a dark spot at upper base of pectoral.

Hab. East coast of Africa and seas of India, ascending rivers, and attaining above a foot in length.

1193. (25.) Mugil troschelii.

Mugil troschelii, *Bleeker, Batavia Nat. Tijdsch.* xvi, p. 277; *Day, Fish. India*, p. 358 (see synon.).

D. 4 | 1/8. A. 3/9. C. 15. L. l. 31–33. L. tr. 11. Cæc. pyl. 4.

Length of head $4\frac{2}{3}$ to 5, of caudal fin 5 to $5\frac{1}{3}$, height of body $4\frac{2}{3}$ to 5 in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ in length of head, nearly 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space nearly flat. Preorbital scaled, emarginate, and strongly serrated along its lower and posterior edges; maxilla bent, and its end uncovered. Upper lip moderately thick and forming end of snout. Mandibles meet at an obtuse angle. Uncovered space below chin narrow, elongate, rounded anteriorly, and constricted along sides. *Teeth*—distinct in upper jaw. *Fins*—first dorsal arises midway between front edge of eye and base of caudal fin, its spines rather strong, three fifths length of head, and as high as second dorsal. Second dorsal twice as high as long, emarginate. First dorsal arises over 9th, second over 18th scale of lat. line. Anal has its anterior third or half in front of base of second dorsal, it is one fourth higher than its base is long, lower edge emarginate. Caudal lunate. *Scales*—18 or 19 rows between snout and base of first dorsal. Second dorsal and anal scaled. A short scale in axilla. *Colour*—silvery, sometimes a darkish spot at upper edge of base of pectoral fin.

Hab. Seas of India to the Malay Archipelago.

1194. (26.) Mugil oligolepis.

Mugil oligolepis, *Bleeker, Batavia Nat. Tijdsch.* xvi, p. 275; *Day, Fish. India*, p. 358, pl. lxxvi, fig. 2 (see synon.).

D. 4 | 1/8. A. 3/9. C. 16. L. l. 26–28. L. tr. 10.

Length of head $4\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—without adipose lids; diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Interorbital space nearly flat.

Dorsal profile from above pectoral to snout rather steep. Preorbital strongly bent, but scarcely notched, serrated at posterior extremity; end of maxilla just visible. Upper lip thin. *Teeth*—not visible. *Fins*—first dorsal spine as long as head excluding snout, rather higher than second dorsal. Second dorsal one third higher than long, it commences behind first third of anal, the latter is higher than second dorsal; 9th and 17th scales of lateral line correspond with origins of the two dorsal fins. Caudal emarginate. *Scales*—none enlarged in axilla. *Colour*—silvery.

Hab. Seas and estuaries of India to the Malay Archipelago.

1195. (27.) Mugil waigiensis.

Mugil waigiensis, *Quoy & Gaim. Voy. Uranie et Phys., Poiss.* p. 337, pl. 59, fig. 2; *Day, Fish. India*, p. 359, pl. lxxiii, fig. 4 (see synon.).

Peddaraki sovere, Tel.

D. 4 | 1/7–8. A. 3/8. L. l. 26–27. L. tr. 9. Cæc. pyl. 10. Vert. 11/13.

Length of head $4\frac{2}{3}$ to 5, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—without adipose lids; diameter $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 2 apart. General appearance short and stout with a depressed head. Snout obtuse; the mandibles form a very obtuse angle. Preorbital bent, not notched, but strongly serrated; lower extremity of maxilla visible. *Teeth*—fine ones in upper jaw. *Fins*—dorsal spines stout, second longest and nearly half height of body, but only two thirds as high as second dorsal; origins of first and second dorsals correspond to 8th and 17th scales of lateral line. Anterior third of anal before origin of second dorsal, the two fins of equal height. Caudal slightly emarginate. *Scales*—some minutely ctenoid, they are extended over the vertical fins; no distinctly elongate one in the axilla. Cæcal appendages bifurcate. *Colour*—brownish above, dull white below, a dark streak along each row of scales; fins generally deep black.

Hab. Red Sea, seas of India to the Malay Archipelago, China, and beyond. This species ascends rivers during the rainy season as high as the tides reach; attains a foot or more in length, and is good eating.

Family XXXVII. AULOSTOMATIDÆ.

Fistularidæ, pt., Müll.; *Aulostomatoidei*, pt., Bleeker.

Branchiostegals five to seven; pseudobranchiæ. Gills four. Body very elongate; the anterior bones of the skull produced, forming a long tube, having a small mouth at its anterior extremity. Teeth small. Spinous dorsal, when present, formed of isolated spines; soft dorsal and anal of moderate length; ventrals abdominal, with six rays, no spine, and separated from the pubic bones,

which are attached to the humeral arch. Scales small or none, but parts of the skeleton or dermal productions may take the form of external plates. Air-bladder large. Pyloric appendages few. Vertebræ numerous.

Geographical Distribution. Tropical and subtropical coasts of Atlantic, Indian, and Pacific Oceans.

1. Genus **FISTULARIA**, Linn.

Syn. *Solenostomus*, sp., Klein & Gronov.; *Cannorhynchus*, Cantor.

Branchiostegals seven. Mouth slightly cleft. Dorsal and anal fins composed entirely of undivided rays; caudal forked, with one or two of its median rays very elongate and filiform. No scales, but some bony casing behind the head above and below.

Geographical Distribution. Tropical Atlantic and Indian Oceans.

1196. (1.) **Fistularia serrata.** (Fig. 116.)

Fistularia serrata, *Cuv. Règn. Anim.* 1817, ii, p. 349; *Day, Fish. India*, p. 360, pl. lxxvi, fig. 3 (see synon.).

Goorum, Tel.; *Tol*, Maráthi.

D. 13–15. P. 13. V. 1/5. A. 14–15. C. 10/1/10.

Length of head $2\frac{1}{2}$ in total to end of tail (excluding the filament). *Eyes*—$1\frac{1}{2}$ to $1\frac{3}{4}$ diameters in postorbital length of head.

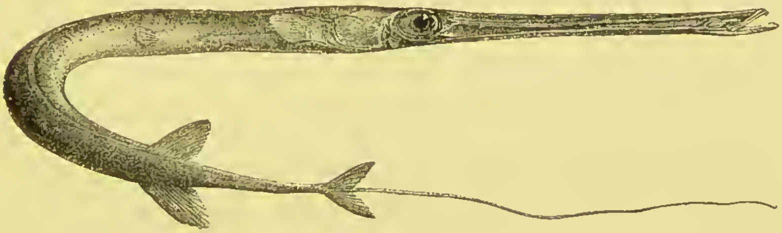

Fig. 116.—*Fistularia serrata.*

A serrated ridge from anterior upper angle of eye to nostril, and continued along the outer margin of the snout, decreasing in strength and finally ceasing about the middle of its length. *Fins*—the rays undivided. *Colour*—brown, dirty white beneath; occasionally light spots on back and sides.

Hab. East coast of Africa, seas of India, Malay Archipelago, China, and New Holland. At the Andaman Islands I found this fish frequenting the most muddy localities; it is common at Madras.

Family XXXVIII. CENTRISCIDÆ.

Fistularia, pt., Müller; *Amphisiloidei*, pt., Bleeker.

Branchiostegals three or four; pseudobranchiæ. Gills four. Anterior bones of the skull produced, forming a long tube, having a small mouth at its anterior extremity. Teeth absent. Two dorsal fins, the first short and having one of its spines strong; the soft dorsal and anal of moderate extent; ventrals abdominal, spineless, and rudimentary. Scales, if present, small; the body usually covered with a cuirass or with ossifications which are not confluent. Air-bladder large. Pyloric appendages absent. Vertebræ few.

Geographical Distribution. Atlantic, Mediterranean, and Indo-Pacific.

1. Genus **AMPHISILE** (Klein), Cuv.

Branchiostegals three or four; pseudobranchiæ. Gill-openings of moderate width. Body elongate and strongly compressed. A dorsal cuirass formed by portions of the skeleton. Two dorsal fins situated far back; ventrals rudimentary.

Geographical Distribution. Indo-Pacific Ocean.

1197. (1.) **Amphisile scutata.** (Fig. 117.)

Centriscus scutatus, *Linn. Syst. Nat.* i, p. 415.
Amphisile scutata, *Day, Fish. India,* p. 361, pl. lxxvi, fig. 5 (see synon.).

Moasa, Arab.

B. iii. D. 3 | 10–12. P. 10. V. 3. A. 12. C. 10. Vert. 6/14.

Length of head $3\frac{1}{4}$, height of body 7 in the total length. *Eyes*—$1\frac{1}{2}$ diameters in postorbital length of head; interorbital space concave. Body strongly compressed. The dermal skeleton ends behind in a long spine, close beneath which are the three spines

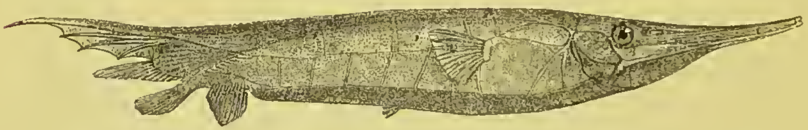

Fig. 117.—*Amphisile scutata.*

of the first dorsal fin; below these again is the second dorsal, whilst the caudal appears on the lower surface of the body just behind the anal. Ventrals rudimentary and situated on the cutting abdominal edge. *Colour*—whitish, shot with pink.

Hab. Seas of India to China.

Family XXXIX. OPHIOCEPHALIDÆ.

Labyrinthici, pt., Cuv.

Branchiostegals five; pseudobranchiæ absent. Gills four. Body elongate, subcylindrical anteriorly; head depressed, having superiorly somewhat plate-like scales. Eyes lateral. Gill-openings wide, the membranes of the two sides connected beneath the isthmus. A cavity exists above and accessory to the true gill-opening, but although some thin bony laminæ are present, no suprabranchial organ is developed. Teeth in the jaws, vomer, and palate. A single, long, spineless dorsal fin, and a similar though shorter anal. Ventrals thoracic or absent; when present consisting of six rays, the outer of which is unbranched and sometimes articulated at its extremity. Lateral line abruptly curved or almost interrupted. Air-bladder present. Pyloric appendages, when present, few.

The *Ophiocephalidæ*, having hollow cavities in their heads, and an amphibious mode of respiration, are able to exist for lengthened periods out of their native element, and can travel some distance over the ground, especially when it is moist. They are able to progress in a serpentine manner, chiefly by means of their pectoral and caudal fins, first one of the former being advanced, and then its fellow.

These fishes appear to be monogamous, some breeding in grassy swamps or the edges of tanks, some in wells or stone-margined receptacles for water, and others again in holes in river-banks. The varieties which live in tanks and swamps keep much to the shallow and grassy edges.

Amongst the fish which I myself saw exhumed from the mud of a dried-up tank were some *Ophiocephali*; they are also recorded by the natives of India as descending with downpours of rain.

Geographical Distribution. Freshwater fishes distributed throughout Baluchistan, Afghanistan, India, Burma, Ceylon, China, Siam, and the Malay Archipelago, from elevated localities and the most inland districts to within the influence of the tides. They inhabit both ponds and rivers; and are known as *Murrel* in Northern India.

Uses. All these fishes are useful as food, those which inhabit rivers being better flavoured than the others which live in sluggish or stagnant water.

Synopsis of Indian Genera.

Ventral fins present .... 1. OPHIOCEPHALUS.
Ventrals wanting .... 2. CHANNA.

1. Genus **OPHIOCEPHALUS**, Bloch.

Ventral fins present. Pyloric appendages two.

Synopsis of Indian Species.

A. Scales on head moderate, 9 or 10 between orbit and angle of preopercle, 15 or 16 between dorsal fin and snout.
  a. Ventral more than half length of pectoral.
    a'. Height of body $\frac{1}{7}$ total length.
      A black white-edged ocellus on tail. 1. *O. marulius*, p. 360.
      No ocellus .... 2. *O. leucopunctatus*, p. 361.
    b'. Height of body $\frac{3}{14}$ length to base of caudal fin.................. 3. *O. pseudomarulius*, p. 361.
  b. Ventral $\frac{2}{5}$ length of pectoral........ 4. *O. barca*, p. 361.
B. Scales on head small, 16 or 17 between orbit and angle of preopercle, 22 between dorsal and snout .... 5. *O. micropeltes*, p. 362.
C. Nine scales between orbit and angle of preopercle, 18–20 between dorsal and snout .... 6. *O. striatus*, p. 363.
D. Scales on head large, 4 or 5 between orbit and angle of preopercle, 12 or 13 between dorsal fin and snout.
  A. 27. Ventral $\frac{1}{3}$ length of pectoral .. 7. *O. stewartii*, p. 363.
  A. 21–23. Ventral $\frac{2}{5}$ length of pectoral. 8. *O. gachua*, p. 364.
  A. 21–23. Ventral $\frac{3}{4}$ length of pectoral. 9. *O. punctatus*, p. 364.

1198. (1.) **Ophiocephalus marulius.**

Ophiocephalus marulius, *Ham. Buch. Fish. Ganges*, pp. 65, 367, pl. 17, fig. 19; *Day, Fish. India*, p. 363, pl. lxxvi, fig. 4 (young) (see synon.).

Hoovina murl, Can.; *Pu verarl*, Tam.; *Pu murl*, Hind.; *Pula chapa*, Tel.; *Choaree verarl* and *Curavu*, Mal.; *Kubrah*, *Sawl*, and *Dowlah*, Punj.; *Holee mâch*, Chittagong; *Nga-yan-daing*, Burm.; *Ha-al*, Assam.; *Saal*, Ooriah.

D. 45–55. A. 28–36. L. l. 60–70. L. tr. $4\frac{1}{2}$–$6\frac{1}{2}$/13–11 or $5\frac{1}{2}$–$8\frac{1}{2}$/13–11.

Length of head from 4 to 5, of caudal fin 6 to $7\frac{1}{2}$, height of body 7 to $7\frac{1}{2}$ in the total length. *Eyes*—diameter 7 (5 in the young) in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout and also apart. Greatest width of the head equals $\frac{1}{2}$ or $\frac{2}{3}$ of its length. *Teeth*—in numerous villiform rows in jaws, vomer, and palate; a posterior row of about 12 large conical teeth on either ramus of mandible. *Fins*—pectoral rather more than half as long as head, but not reaching to above origin of anal; ventral two thirds as long as pectoral. *Scales*—on summit of head of moderate size; 16 rows between snout and base of dorsal fin, 10 between eye and angle of preopercle. *Lateral line*—first passes along 16 or 18 rows of scales, then descends for two rows, and subsequently passes direct to centre of caudal. *Colour*—varies with age and the water. Back greyish green; the immature with a brilliant orange band passing from eye to middle of tail, in the more mature there are five or six cloudy bands descending to below lateral line; abdomen orange; on posterior third of body, on dorsal, anal, and caudal fins are

pearly-white spots. There is generally a large black ocellus at upper part of base of caudal fin, which is grey; ventrals orange.

Hab. Fresh waters, principally rivers, from Ceylon and India to China; attaining as much as four feet in length. These fish take a live bait pretty well.

I am doubtful whether the two next species, *O. leucopunctatus* and *O. pseudomarulius*, might not be considered varieties of *O. marulius.*

1199. (2.) Ophiocephalus leucopunctatus.

Ophiocephalus leucopunctatus, *Sykes, Tr. Z. S.* ii, p. 352, pl. 60, fig. 3; *Day, Fish. India*, p. 364, pl. lxxvii, fig. 1 (see synon.).

Sowarah, Tel.; *Maral*, Maráthi.

D. 47–53. A. 28–35. L. l. 59–60. L. tr. $4\frac{1}{2}$–$6\frac{1}{2}$/13–11 or 5–8/13–11.

Length of head 4, height of body 7 to $7\frac{1}{4}$ in the total length. *Eyes*—diameter 8 in length of head, $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. *Teeth*—about ten conical, widely separated teeth in lower jaw. *Fins*—dorsal commences over end of opercle; ventral $\frac{2}{3}$ as long as pectoral. *Scales*—as in *O. marulius. Colour*—back greyish green, descending in bars on to an orange abdomen; numerous white spots on body, sometimes with black margins; caudal and posterior portions of dorsal and anal black, with numerous white spots.

Hab. Coromandel and Western coasts of India, some of the rivers in the Deccan and the Cauvery in Mysore. This species is also said to be found in China. It attains 3 feet or more in length.

1200. (3.) Ophiocephalus pseudomarulius.

Ophiocephalus pseudomarulius, *Günther, Catal.* iii, p. 478; *Day, Fish. India*, p. 364.

D. 52. P. 17. V. 6. A. 35. C. 15. L. l. 64. L. tr. 6–7/14–10.

Length of head $3\frac{1}{4}$, height of body $4\frac{2}{3}$ in the total length to base of caudal fin. *Eyes*—diameter 7 in length of head, 1 diam. from end of snout, and $1\frac{3}{4}$ apart. *Teeth*—an inner row of six or eight, rather widely separated and conical, in the lower jaw. *Fins*—dorsal commences above base of pectoral. Pectoral $\frac{1}{2}$ as long as head; ventral $\frac{3}{4}$ of pectoral. *Scales*—16 rows between snout and base of dorsal fin; 10 between eye and angle of preopercle. *Colour*—grey superiorly, lighter along the sides and beneath. "A black, white-edged ocellus superiorly on the basal portion of the caudal fin" (*Günther, l. c.*).

Hab. India.

1201. (4.) Ophiocephalus barca. (Fig. 118.)

Ophiocephalus barca, *Ham. Buch. Fish. Ganges*, pp. 67, 367, pl. 35, fig. 20; *Day, Fish. India*, p. 365, pl. lxxvii, fig. 2 (see synon.).

D. 47–52. P. 16. A. 34–36. C. 19. L. l. 60–65. L. tr. 5-6/13.

Length of head 4 to $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$ to $5\frac{1}{2}$, height of body $5\frac{1}{2}$ to $7\frac{1}{2}$ in the total length. *Eyes*—diameter 7 to $7\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and 2 apart. *Teeth*—amongst the small ones are a few, widely separated and conical, in an inner row in the lower jaw, two or three large teeth on vomer, and a few on the palatines. *Fins*—dorsal commences above posterior extremity of opercle and is almost $\frac{3}{4}$ as high as body. Ventral $\frac{2}{5}$ of length of pectoral. Caudal rounded. *Scales*—15 rows between snout and base of dorsal fin, 9 rows between eye and angle of preopercle; larger in anterior part of body than in posterior.

Fig. 118.—*Ophiocephalus barca.*

Colour—dark violet superiorly, becoming dull white shot with purple beneath; the whole back and sides covered with large black blotches, also some on dorsal, caudal, and anal fins, each of which has a red edge; pectorals reddish, with numerous black spots.

Hab. Large rivers of the Bengal Presidency, North-Western Provinces, and Assam; attaining three feet in length.

1202. (5.) Ophiocephalus micropeltes.

Ophiocephalus micropeltes (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* vii, p. 427; *Day, Fish. India*, p. 365, pl. lxxvii, fig. 4 (see synon.).

D. 43–46. A. 27–30. L. l. 95–110. L. tr. 7–8/13–12. Vert. 53.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, of caudal fin $6\frac{1}{2}$ to $7\frac{1}{2}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter $8\frac{1}{2}$ in length of head (7 in the young), 2 to 3 diam. from end of snout, 2 to $2\frac{1}{4}$ apart. *Teeth*—a widely separated conical row in lower jaw, vomer, and palatines. *Fins*—dorsal commences above last fourth of opercles, and is of equal height to the anal or $\frac{1}{2}$ height of body. Ventral about half as long as pectoral. Caudal fan-shaped. *Scales*—22 rows between snout and base of dorsal fin, 16 or 17 between eye and angle of preopercle. *Lateral line*—descends gently to a little behind end of pectoral, then becomes straight. *Colour*—varies considerably. In the *adult* greyish brown, with the head, back, and sides sprinkled with small brown spots; dorsal fin grey, with three or four narrow dark bands and a white outer edge; anal grey, with a white margin; caudal grey, spotted with black, and having a narrow white outer edge. In the *young*, and up to 12, 14, or even

18 inches in length, the back is greyish, sides orange-scarlet; a black band through the eye to upper half of caudal fin, and a second from angle of the mouth to lower half. In some, vertical bars are also present.

Hab. Malabar and Western coast of India, Siam to the Malay Archipelago; attaining at least three feet in length.

1203. (6.) Ophiocephalus striatus.

Ophiocephalus striatus, *Bloch, Ich.* t. 359; *Day, Fish. India,* p. 366 (see synon.).

Morrul, Murl, Dheri murl, Hind.; *Sol* and *Chena,* Beng.; *Verarl* and *Wrahl,* Mal.; *Verarlu* and *Currupu verarl,* Tam.; *Sowarah,* Tel.; *Sola,* Ooriah; *Koochina murl,* Canarese; *Loolla, Hál-pat-málu,* Singhalese; *Nga-ain-di,* Mugh; *Dákhu,* Maráthi; *Nga yan* and *Nga yan khoung-to,* Burmese.

D. 37–45. A. 23–26. L. l. 50–57. L. tr. $4\frac{1}{2}$–7/9–7, or $5\frac{1}{2}$–8/10–9.

Length of head $3\frac{1}{3}$ to 4, of caudal fin 6, height of body 6 to 8 in the total length. *Eyes*—6 to 7 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. *Teeth*—an inner conical row in lower jaw, cardiform on palatines. *Scales*—on summit of head large and irregularly shaped; 18 to 20 rows between snout and origin of dorsal fin; 9 rows between eye and angle of preopercle. The number of rows between lateral line and dorsal fin appears subject to variation. *Lateral line*—curves downwards below twelfth dorsal ray. *Colour*—dark greyish or blackish superiorly, dirty white or yellowish white beneath; cheeks and lower surface of mouth streaked and spotted with grey; bands of grey or black from sides to abdomen. Some spots and bars at posterior end of dorsal fin, ventrals and anal greyish, with some whitish lines or spots along base of latter. In the young there is occasionally a large black ocellus at end of base of dorsal, and the body may be destitute of any marks.

Hab. Fresh waters throughout the plains of India, Ceylon, Burma, China, and the Philippines, especially delighting in swamps and grassy tanks; attaining 3 feet or more in length. These fishes take a bait very readily, especially a frog, and are said to rise to a salmon-fly.

1204. (7.) Ophiocephalus stewartii.

Ophiocephalus stewartii, *Playfair, P. Z. S.* 1867, p. 14, pl. 3; *Day, Fish. India,* p. 367, pl. lxxvii, fig. 3.

Sen-ga-lec, Assam.

D. 39–40. P. 17. V. 6. A. 27. C. 14. L. l. 47–50. L. tr. $4\frac{1}{2}$–$5\frac{1}{2}$/9–7.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body 7 to 8 in the total length. *Eyes*—diameter $6\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and 2 apart. *Teeth*—some conical in the lower jaw, also on vomer and palate. *Fins*—dorsal commences over

base of pectoral, is $\frac{2}{3}$ as high as body and higher than anal. Ventral about $\frac{1}{3}$ as long as pectoral. *Scales*—13 rows between snout and base of dorsal, five between eye and angle of preopercle. *Colour*—purplish black superiorly, lighter on sides and beneath; many scales on body with a round black mark. Fins dark, the pectoral in the young yellow in its lower half, with a blue basal spot, external to which it has several vertical black bands; dorsal edged with yellow.

Hab. Cachar and Assam, in both running and standing water, growing to about 10 inches in length.

1205. (8.) Ophiocephalus gachua.

Ophiocephalus gachua, *Ham. Buch. Fish. Ganges*, pp. 68, 367, pl. 21, fig. 21; *Day, Fish. India*, p. 367 (see synon.).

Kora motta, Tel.; *Dheri dhok*, Hind.; *Karavu*, Mal.; *Para korava*, Tam.; *Kanayá*, Singhalese; *Mah korava*, Can.; *Chenga* or *Chayung*, Ooriah; *Doarrah*, Punj.; *Chen-gah*, Assam.

D. 32–37. P. 15. A. 21–23. C. 12. L. l. 40–45. L. tr. 3–4/7–6.

Length of head $3\frac{1}{2}$ to $4\frac{1}{4}$, of caudal fin $5\frac{1}{2}$ to 6, height of body 6 in the total length. *Eyes*—diameter 6 in length of head, 1 diam. from end of snout, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. *Teeth*—an inner row, widely separated and conical, in lower jaw, some also on vomer and palatines. *Fins*—pectoral as long as head behind eyes, ventral $\frac{2}{5}$ length of pectoral. *Scales*—broad and irregular on summit of head; 4 or 5 rows between orbit and angle of preopercle; 12 between snout and base of dorsal fin. *Lateral line*—bends downwards after about 12 scales. *Colour*—varies materially, according to the water in which the fish resides: usually greenish, lighter beneath; dorsal, caudal, and anal slate-coloured, with orange margins; pectoral with a black base, transversely barred (except in some Andaman specimens), and having a slight reddish or orange edge. In the young there is often a large ocellus with a light edge on the last five dorsal rays; caudal barred. Occasionally the body is spotted with white, or even orange.

Hab. Fresh waters throughout India, Ceylon, Burma, and the Andamans, also near Gwádar on the Mekran coast; attaining at least 13 inches in length.

1206. (9.) Ophiocephalus punctatus.

Ophiocephalus punctatus, *Bloch, Ich.* t. 358; *Day, Fish. India*, p. 367, pl. lxxviii, fig. 1 (variety) (see synon.)

Phool dhok, Hind.; *Korava* and *Para korava*, Tam.; *Beli-korava*, Canarese; *Muttah*, Tel.; *Gorissa*, *Gurrie*, and *Cartua gorai*, Ooriah and Assamese; *Dulloonga*, Punj.; *Nga-ain*, Mugh; *Nga rynowk* and *Chankee*, Arracan; *Nga panau*, Burm.; *Dhoalee*, Sind.; *Black caboose* of Europeans.

D. 29–32. P. 17. A. 21–23. C. 12. L. l. 37–40. L. tr. 4–5/9 | 9/6.

Length of head $3\frac{1}{3}$ to $3\frac{2}{3}$, of caudal fin $5\frac{1}{4}$ to $6\frac{1}{4}$, height of body $5\frac{1}{2}$ to 7 in the total length. *Eyes*—diameter 7 to $8\frac{1}{2}$ in length of head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $1\frac{2}{3}$ to 2 apart. *Teeth*—a posterior row of four or five conical ones in lower jaw. *Fins*—pectoral half length of head or even more, reaching to above origin of anal; ventral $\frac{3}{4}$ as long as pectoral. Dorsal $\frac{2}{3}$ height of body, and a little higher than anal. *Scales*—on summit of head large and of irregular shapes; 12 rows between snout and origin of dorsal, five rows between eye and angle of opercle. *Lateral line*—with a slight curve above fourth anal ray. *Colour*—varies with the water. Back greenish, becoming yellow on sides and abdomen, with a dark stripe along side of head; several bands from back pass downwards to middle of body. Fins spotted, vertical fins with a narrow light edge and dark basal band; ventrals white or grey. Some specimens have scattered black spots over the body and head.

Hab. Fresh waters, generally in the plains of India, stagnant preferred to running. This species attains to about a foot or a little more in length. I found a female, in February, containing upwards of 4700 large, besides some small ova. Ceylon (*Günther*).

2. Genus CHANNA, Gronovius.

Differs from *Ophiocephalus* in the absence of ventral fins and cæcal appendages.

Geographical Distribution. Ceylon and China.

1207. (1.) Channa orientalis. (Fig. 119.)

Channa orientalis, *Bl. Schn.* p. 496, t. 90, fig. 2; *Day, Fish. India*, p. 368, pl. lxxviii, fig. 2 (see synon.).

D. 34. P. 14. A. 22. C. 14. L. l. 41. L. tr. $3\frac{1}{2}$–$4\frac{1}{2}$/7–6.

Length of head $3\frac{2}{3}$ to $4\frac{1}{3}$, height of body $6\frac{1}{2}$ to 8 times in total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. *Teeth*—some enlarged in the lower jaw.

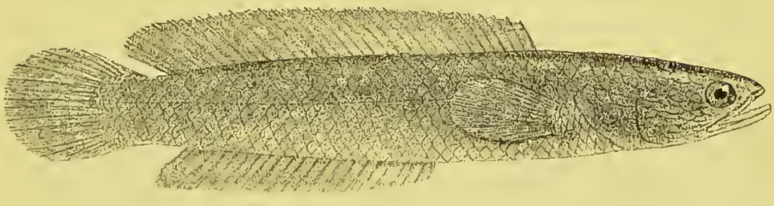

Fig. 119.—*Channa orientalis.*

Fins—pectoral equals length of postorbital portion of head. *Scales*—with longitudinal striated and raised lines. *Colour*—dirty greenish superiorly, dull white or brown on sides and beneath;

there appear to be some darkish spots on the body and fins. Pectoral with vertical bars on its basal third.

Hab. Fresh waters of Ceylon.

Family XL. LABYRINTHICI.

Anabantidæ, pt., Richardson; *Spirobranchidæ*, pt., Swainson; *Labyrinthibranchii*, pt., Owen; *Osphromenoidei*, pt., Bleeker.

Pseudobranchiæ rudimentary or absent. Gills four. Body compressed, oblong, or elevated. Eyes lateral. Gill-opening rather narrow, the membranes united below the isthmus. A cavity above the third or upper portion of the first branchial arch contains an elaborate apparatus consisting of thin laminæ of bone, covered by a vascular mucous membrane, and employed for respiratory purposes. Number of dorsal and anal spines variable; ventrals thoracic. Scales ctenoid and of moderate size. Lateral line interrupted or absent. Air-bladder present or absent. Pyloric appendages when present few.

Geographical Distribution. Freshwater and estuary fishes of Asia and South Africa. They can live a considerable period out of their natural element, as they are able to respire atmospheric air directly. They comprise both vegetable and animal feeders, and are often acclimatized in other countries. When domesticated they are subject to considerable variation.

Uses. All are considered good for eating.

Synopsis of Indian Genera.

A. Teeth on palate; opercles and preorbital serrated. 1. ANABAS.
B. No teeth on palate.
V. 1/5. Dorsal and anal spines much more numerous than rays .... 2. POLYACANTHUS.
V. 1/5. Spines either fewer than rays, or very little more numerous...................... 3. OSPHROMENUS.
Ventral reduced to a single filiform ray .... 4. TRICHOGASTER.

1. Genus **ANABAS**, Cuvier.

Branchiostegals six. Superbranchial organ well developed. Branchial arches with toothed tubercles. Mouth rather small. Opercles and preorbital serrated. Teeth villiform in jaws and on the anterior and posterior extremities of the vomer; none on the palatines. Dorsal fin single, the spinous portion of greater extent than the soft; anal spines numerous, but fewer than the dorsal. Scales ctenoid, rather large. Lateral line interrupted. Air-bladder bifid posteriorly, with either extremity produced. Pyloric appendages few or absent.

Geographical Distribution. India, the Malay Archipelago, and the Philippine Islands; most numerous in the maritime provinces and the deltas of the larger rivers.

1208. (1.) **Anabas scandens.** (Fig. 120.)

Perca scandens, *Daldorff, Trans. Linn. Soc.* iii, 1797, p. 62.
Anabas scandens, *Day, Fish. India,* p. 370, pl. lxxviii, fig. 3 (see synon.).

Undee-collee, Mal.; *Pauni-eyri* and *Sennal,* Tam.; *Coi* and *Corvu,* Beng., Assam., and Ooriah; *Nga-pri,* Arracan; *Nga-bye-ma,* Burm.; *Kavaya* or *Kawhy-ya,* Singhalese.

D.17–18/8–10. A.9–10/9–11. L.l.28–32. L.tr.3–4 | 9–10. C.p.0–3.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body 3 to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and $1\frac{3}{4}$ to 2 apart. Preorbital strongly denticulated; posterior edge of opercle, also of sub- and interopercles strongly spinous, shoulder-scale generally with two or three denticulations. *Teeth*—villiform in jaws, the outer row rather the largest; a small patch on front end of vomer, none on palatines. *Fins*—spinous portion of the dorsal fin $\frac{5}{6}$ of entire length at the

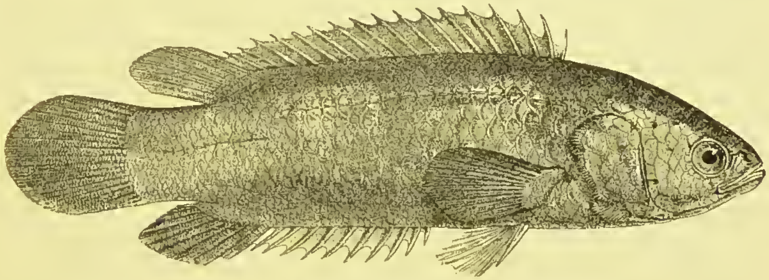

Fig. 120.—*Anabas scandens.*

base, soft portion higher than spinous. *Scales*—some over soft dorsal, caudal, anal, and base of pectoral. *Lateral line*—interrupted about seventeenth scale. *Colours*—rifle-green, becoming lighter on abdomen. During life there are usually four wide vertical body-bands, and a dark stripe from the angle of the mouth to the preopercle. The *young* have a black blotch on side of base of tail, surrounded by a light, sometimes yellow, ring; usually they have a black spot at the end of the opercle.

Hab. Estuaries and fresh waters of India, Ceylon, and Burma, the Malay Archipelago and Philippines; attaining at least $8\frac{1}{2}$ inches in length. The breeding-season is about June and July.

2. Genus **POLYACANTHUS,** Cuvier & Valenciennes.

Branchiostegals six; pseudobranchiæ glandular or absent. Body

oblong, compressed. Mouth small and but little protractile. Opercles spineless. Teeth small and fixed in the jaws; palate edentulous. Dorsal fin single, the spinous portion of much greater extent than the soft; the anal similar; ventral with one spine and five well-developed rays, some of which are usually elongate. Scales rather large, ctenoid. Lateral line interrupted, sometimes partially or even entirely absent. Air-bladder simple. Pyloric appendages, when present, few.

Geographical Distribution. Fresh waters and estuaries along the coasts of Southern India and Ceylon, but usually not far inland. Also in the Malay Archipelago.

Synopsis of Indian Species.

D. 14–16/5–7. Greenish, a scarlet ventral ray . . 1. *P. cupanus*, p. 368.
D. 16–17/8–10. Olive . . . . 2. *P. signatus*, p. 369.

1209. (1.) **Polyacanthus cupanus.** (Fig. 121.)

Polyacanthus cupanus, *Cuv. & Val. H. N. Poiss.* vii, p. 357; *Day, Fish. India*, p. 371, pl. lxxviii, fig. 4 (see synon.).

Caringanah and *Wunnuttee*, Mal.; *Punnah* and *Pauni*, Tam.; *Ta-but-ti*, Can. and Mal.; *Heb-bu-ti*, Tel.

D.14–17/5–7. P.10. A.16–19/9–11. C.13. L.l.29–32. L.tr.4/7–8.

Length of head 4 to 5, height of body 4 in the total length. *Eyes*—diameter 4 to 5 in length of head, 1. diam. from end of snout and apart. Preorbital serrated. Posterior half and angle of preopercle finely serrated, as also the subopercle and posterior half of interopercle. *Fins*—dorsal spines not so high as rays; caudal wedge-shaped. *Lateral line*—a single round hole in each scale, ceasing about fourteenth scale. *Colour*—rifle-green, the prolonged ventral ray scarlet; caudal barred in spots, as is also the

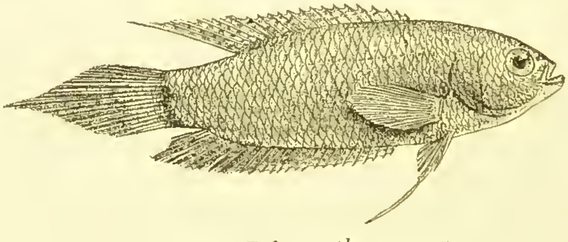

Fig. 121.—*Polyacanthus cupanus.*

dorsal, more especially the soft portion; a round dark spot at base of caudal, and numerous small spots on the head. *Variety*—rose-coloured, with two horizontal black bands, one from above orbit to upper part of caudal fin, the other from angle of mouth through eye to lower part of same fin; head and cheeks spotted.

Hab. Malabar and Coromandel coasts, often found in ditches, paddy-fields, and shallow waters, generally within or not far

removed from tidal influence, but I have likewise taken it in the Bhaváni at Mettupálaiyam and along the base of the Gháts in Canara. It lurks under stones or amongst weeds, and grows to about 3 inches in length.

1210. (2.) Polyacanthus signatus.

Polyacanthus signatus, *Günther, Catal.* iii, p. 379; *Day, Fish. India,* p. 371.

Porlotta, Singhalese (Boake).

D.16–17/8–10. A.14–16/10–12. L.l.29–32. L.tr.4/9. Vert.10/16.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, 1 diam. from end of snout, and 1 apart. Lower edge of preorbital very finely serrated; angle of preopercle finely serrated, other opercles entire. *Teeth*—villiform, outer row in jaws rather enlarged, some specimens have a caniniform tooth on either side of middle of lower jaw. *Fins*—dorsal spines stout, rather short, increasing in length to the last; soft portions of dorsal and anal elongate and pointed from the prolongation of their central rays; outer ventral ray prolonged into two filaments. Caudal with its central rays longest. *Lateral line*—sub-interrupted. *Colour*—reddish olive in spirit; probably greenish during life; a round blackish spot on middle of base of soft dorsal.

Hab. Ceylon and Java; attaining at least 5 inches in length.

3. Genus OSPHROMENUS * (Commerson), Lacépède.

Syn. *Trichopus,* Lacép.; *Ctenops,* McClelland; *Trichopsis,* Kner.

Branchiostegals six. Body moderately elevated, compressed. Opercle without a spine; opercular pieces serrated in the immature. Mouth small, oblique, protractile. Small and fixed teeth in the jaws, none on the palate. One dorsal fin, its spinous portion sometimes in excess, but generally less in extent than its soft part. Anal spines in varying numbers. Outer ventral ray

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* Osphromenus olfax, Commerson.

Osphromenus olfax, *Hardwicke, Zool. Journ.* iv, p. 313; *Day, Fish. India,* p. 372, pl. lxxix, fig. 6 (see synon.).

Osphromenus gourami, *Cuv. & Val. H. N. Poiss.* vii, p. 377, pl. 198 (immature).

D. 11–14/11–12. A. 9–12/19–21. L. l. 30–38. L. tr. 5–8/13. Vert. 12/18–19.

The abdominal profile more convex than the dorsal. *Fins*—dorsal commencing above origin of anal, in anterior half of body; spines increasing in length to last, sixth and seventh rays longest; first ventral ray reaches base of caudal. *Colours*—greenish brown, lighter below; four or five vertical bands in the immature.

Hab. China, and fresh waters of the Malay Archipelago. *Naturalized* in Mauritius, Cayenne, Australia, and introduced into some parts of India, viz. near Calcutta, Madras, and the Neilgherries. Attains 20 lbs. or more in weight, and is excellent eating when kept in clean water.

long, filiform, the remainder being generally rudimentary. Scales ctenoid, and of moderate size. Lateral line, when present, uninterrupted. Air-bladder present. Pyloric appendages two.

Geographical Distribution. South-eastern Asia and Malay Archipelago. One species has been introduced into India; and another is found in Assam, N.E. Bengal, Sikkim, and Nepal.

Uses. Excellent as food.

1211. (1.) **Osphromenus nobilis.** (Fig. 122.)

Ctenops nobilis, *McClelland, Cal. Jour. Nat. Hist.* v, p. 281, pl. 21, fig. 1.

Osphromenus nobilis, *Day, Fish. India*, p. 372, pl. lxxviii, fig. 5 (see synon.).

D.5–6/7–8. P.12. A.5/23–25. C.16. L.l.28–31. L.tr.6/12. C.p.2.

Length of head $3\frac{1}{2}$ to 4, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout and also apart. The posterior extremity of the intermaxillaries reaches to opposite the front edge of the eye, the maxilla $\frac{4}{5}$ of the same distance. Preorbital rather large and

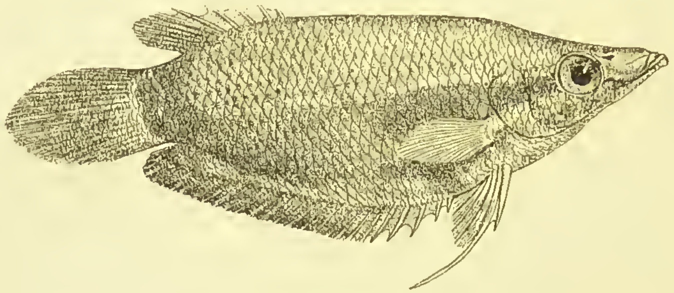

Fig. 122.—*Osphromenus nobilis.*

coarsely serrated, also the lower edge of the preopercle. *Fins*—dorsal small, and situated in posterior third of body. Outer ventral ray prolonged in some specimens. Anal commences close behind end of ventral spine, and is continued almost to caudal, from which it is separated by a notch. *Scales*—ctenoid, extending over bases of vertical fins. *Colour*—brown; a silvery-white band, usually interrupted, passes from eye to middle of tail; a second similar one from pectoral along side, and a third at base of anal. Sometimes a black light-edged ocellus at upper part of base of caudal fin.

Hab. Rivers of N.E. Bengal and Assam, extending into those of the hills, and attaining at least 4 inches in length.

4. Genus **TRICHOGASTER**, Bl. Schn.

Syn. *Colisa*, Cuv. & Val.

Branchiostegals five; branchial arches with toothed tubercles.

Opercle entire; preopercle usually serrated. Cleft of mouth small, jaws little protractile. A single dorsal fin, the spinous portion more developed than the soft; anal similar, but of greater extent. Ventral consisting of a single elongate filiform ray. Teeth small in the jaws; vomer and palatines edentulous. Lateral line, when present, interrupted. Air-bladder divided posteriorly into two portions. Pyloric appendages few. Intestines with many convolutions.

The numbers of spines and rays in the dorsal and anal fins are subject to considerable variation in species of this genus, and the character of the caudal is not invariably constant. The subopercle may be serrated or entire. The lateral line has been said to be present in some, absent in others; on this, however, undue stress has been laid.

Geographical Distribution. Large rivers and waters in their vicinity throughout Sind, the Punjab, N.W. Provinces, Bengal, Assam, and Burma, but not south of the Kistna river, throughout the Madras Presidency, along the western coast, or in Ceylon.

Synopsis of Indian Species.

A longitudinal band on side .... 1. *T. chuna*, p. 371.
Eight to ten oblique dark bands; dorsal elongate and pointed behind .... 2. *T. labiosus*, p. 372.
Fourteen or more oblique orange bands on sides. 3. *T. fasciatus*, p. 372.
Sides transversely banded with scarlet and light blue .... 4. *T. lalius*, p. 373.

1212. (1.) Trichogaster chuna.

Trichopodus chuna, *Ham. Buch. Fish. Ganges*, pp. 121, 372.
Trichogaster chuna, *Day, Fish. India*, p. 373, pl. lxxix, fig. 3 (see synon.).

Bah-say-lee or *Bainsa-saylee*, Assam.; *Chuna kholisha, Bilk Songtak, Kalak* at Goalpara (H. B.).

D. 17–18/7–8. P. 9. V. 1. A. 17–20/11–15. L. l. 27–29. L. tr. 5/10.

Length of head $3\frac{1}{2}$ to 4, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ to 3 in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. from end of snout, and 1 apart. *Fins*—dorsal spines increasing in length to last, which equals postorbital length of head, and is $\frac{2}{3}$ as high as soft dorsal, which is longest in its middle. Caudal slightly emarginate. *Scales*—ctenoid, but slightly extended over soft portion of anal fin so as to form a short sheath for the spines. *Lateral line*—present. *Colour*—dull greenish, lighter along abdomen; a dark, sometimes black band from eye along side to lower half of tail. A dark band in upper third of dorsal, and another along the base of that fin; anal banded similiarly to dorsal, a dark band along base of soft portion. Caudal sometimes with a black spot at its base, last third rather dark, occasionally with two or three transverse bands.

Hab. From the Brahmaputra at Dibrugurh, Upper Assam, to the Hooghly at Calcutta. Out of 20 specimens the largest is 1·8 inches in length.

1213. (2.) Trichogaster labiosus.

Trichogaster labiosus, *Day, Fish. India*, p. 374, pl. lxxix, fig. 4.

D. 17/9. P. 10. V. 1. A. 17–18/18. C. 15. L. l. 30. L. tr. 5–6/12.

Length of head $4\frac{1}{4}$, height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Preorbital denticulated. Preopercle very slightly rounded at angle, lower margin rather strongly serrated. Lips very thick and covered with papillæ (as in *Labeo*). *Fins*—dorsal spines increase in length to last, which is $\frac{2}{5}$ as long as head; soft dorsal pointed, third to fifth rays elongate, and from two to three times as long as last spine. Soft portion of anal elongate, but not to so great an extent as soft dorsal. Caudal wedge-shaped. *Scales*—a few over base of anterior anal spines, increasing posteriorly, soft portion of fin densely scaled; fewer scales on soft dorsal. *Colour*—greenish superiorly, lighter beneath, eight to ten obliquely vertical dark bars on sides. A light yellowish-red band, dark-edged posteriorly, from eye across lower jaw behind the lip. Fins dark, outer edge of anal yellowish red.

Hab. Burma, found in the Irrawaddy at Rangoon, and at least as high as Mandalay. Grows to over 3 inches long.

1214. (3.) Trichogaster fasciatus. (Fig. 123.)

Trichogaster fasciatus, *Bl. Schn. Syst. Ich.* p. 164, t. 36; *Day, Fish. India*, p. 374, pl. lxxviii, fig. 6 (see synon.).

Kussuah and *Coilia*, Ooriah; *Ponundi*, Tel.; *Kun-gee*, Punj.; *Pich-ru*, Sind.; *Koh-lee-hona*, Assam.; *Nga-pin-thick-kouk* and *Nga-phyin thaleb*, Burm.

D. 15–17/9–13. A. 15–18/14–19. L. l. 29–31. L. tr. $4\frac{1}{2}$–$5\frac{1}{2}$/11–12.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$, height of body $2\frac{2}{3}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and $1\frac{1}{2}$ to $1\frac{3}{4}$ apart. Lower limb of preopercle serrated, and sometimes a few serrations on subopercle. *Fins*—last dorsal spine longest and equal to postorbital length of head; the soft portion in some is rounded, in others more pointed and even $\frac{1}{4}$ longer than last spine; soft anal resembles soft dorsal; caudal notched or cut square. *Scales*—few on vertical fins of Assam specimens, more on those from Calcutta or Ganjam. *Colour*—greenish above, dirty white below; a green spot on either gill-cover; eyes red; fourteen or more orange bands descend obliquely downwards and backwards from back to abdomen; ventral fin

edged with red and variegated with black, green, and white; dorsal and caudal fins spotted with orange. Immature specimens with a black spot at root of caudal fin.

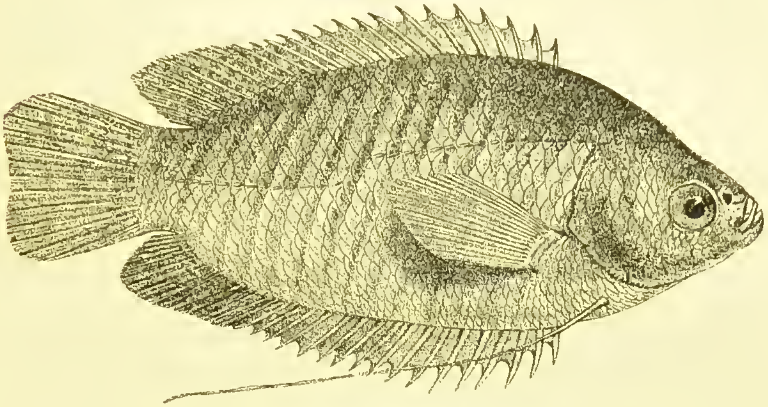

Fig. 123.—*Trichogaster fasciatus.*

Hab. The Coromandel coast as far south as the River Kistna, the estuaries of the Ganges; Cachar, Assam, Punjab, N.W. Provinces, Sind, and Burma; attaining to 5 inches in length.

1215. (4.) Trichogaster lalius.

Trichopodus lalius, *Ham. Buch. Fish. Ganges*, pp. 120, 372.
Trichogaster lalius, *Day, Fish. India*, p. 375, pl. lxxix, fig. 5 (see synon.).

Kung-gee, Punj.; *Lal kholisha*, Assam.

D. 15–16/7–8. P. 10. A. 17–18/13–14. L. l. 26–28. L. tr. $4\frac{1}{2}$–$5\frac{1}{2}$/10.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $2\frac{1}{3}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Preorbital denticulated; lower limb of preopercle serrated, subopercle entire. *Fins*—dorsal spines increase in length to last; soft dorsal and anal rounded, not produced. Caudal rounded, in large specimens cut square, or even very slightly notched. *Scales*—covering soft dorsal, and very densely the soft portion of anal, they form a high sheath to the anal spines. *Colour*—vertically banded with scarlet and light blue, half of each scale of either colour. Dorsal and caudal fins barred in scarlet dots. Anal with a dark band along its base, and a red outer edge.

Hab. Ganges and Jumna rivers, very common at Calcutta, also in Sind; attaining nearly 2 inches in length.

Family XLI. TRACHYPTERIDÆ.

Tænioidei, pt., Cuv.; *Gymnetridæ*, pt., Swainson.

Pseudobranchiæ present. Body elongate and strongly compressed. Gill-openings wide; gills four. Eyes lateral. Cleft of mouth slight. Dentition feeble. Dorsal fin single, occupying the whole back, composed of rays that are neither branched nor articulated, anterior portion detached; anal absent; caudal not in the longitudinal axis of the fish, or rudimentary; ventrals thoracic. Scales absent. Pyloric appendages numerous. Vertebræ many. Bones soft.

Geographical Distribution. All oceans, chiefly at great depths.

1. Genus **REGALECUS**, Brünn.

Syn. *Gymnetrus*, Bl. Schn.

Ventral in the form of a single filament with a dilated extremity. Caudal fin, if present, minute.

1216. (1.) **Regalecus russellii.** (Fig. 124.)

Gymnetrus russellii (*Shaw*), *Cuv. & Val. H. N. Poiss.* x, p. 377.
Regalecus russellii, *Day, Fish. India*, p. 376, pl. lxxix, fig. 2, *Suppl.* p. 800 (see synon.).

B. v. D. 4–5/320. P. 11. V. 1. C. 4.

Body lanceolate, smooth, without scales. Mouth small, oblique. *Teeth*—absent. *Fins*—four or five rays on the head, at first distinct, subsequently uniting and forming a long filament; second dorsal extends from neck to near caudal fin, the middle rays the longest. Pectorals short. Caudal distinct from dorsal, consisting of four rays united into one filament. *Colour*—pale silver; dorsal fin with a dark edge.

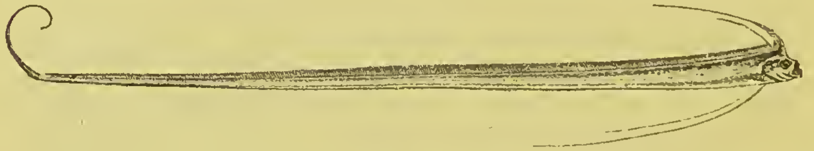

Fig. 124.—*Regalecus russellii.*

A fish described and figured by Russell, 2 feet 8 inches long, was captured on the outside of the surf at Vizagapatam, March 1788. The species does not appear to have been subsequently observed.

Hab. Vizagapatam.

Family XLII. GLYPHIDODONTIDÆ.

Sciænoidei, pt., Cuv.; *Labroidei ctenoidei*, Müller; *Ctenolabridæ*, Owen; *Pomacentridæ*, Günther.

Pseudobranchiæ present. Gills three and a half. Eyes lateral.

Body more or less short and compressed. Teeth in jaws feeble, palate edentulous; inferior pharyngeal bones coalescing, with or without a median longitudinal suture. A single dorsal fin with the spinous part well developed; the soft anal similar to the soft dorsal, and with two or three spines; ventrals thoracic, 1/5. Scales ctenoid. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Tropical seas; a few species in temperate regions.

Müller separated from the rest of the Acanthopterygian fishes under the name of *Pharyngognathi* the families (such as *Pomacentridæ* or *Glyphidodontidæ*, *Labridæ* and *Chromides*) which had the inferior pharyngeal bones coalesced. Subsequently it was pointed out by Kner that in the genus *Gerres* (*Percidæ*, see Vol. I. p. 535) several species have this conformation, but that *G. macrosoma* has not. Professor Peters has shown that *G. plumieri* and some other East-Indian species are also exceptions. A structural peculiarity which is insufficient for generic distinction in the case of *Gerres* cannot be employed for dividing the Acanthopterygian order of fishes into two.

Synopsis of Indian Genera.

A. All the opercles denticulated.
- Preorbital denticulated, but without a spine. 1. AMPHIPRION.
- Preorbital ending behind in a long spine .. 2. PREMNAS.

B. The preoperculum serrated, other opercles not.
- Teeth in a villiform band .... 3. TETRADRACHMUM.
- Teeth in a single row .... 4. POMACENTRUS.

C. None of the opercles serrated.
- Teeth compressed .... 5. GLYPHIDODON.
- Teeth conical.......................... 6. HELIASTES.

1. Genus AMPHIPRION, Bl. Schn.

Syn. *Coracinus*, sp., Gronov.; *Prochilus* (Klein), Cuv.

Branchiostegals five. All the opercles and preorbital denticulated, the denticles on the opercle and subopercle being almost spinose. Teeth in the jaws in one row, conical and small. Scales of moderate or rather small size. Dorsal fin with from 9 to 11 spines; anal with two. Lateral line ceases in a tubular form below the end of the dorsal fin, or is continued lower down in the form of a simple orifice in each scale. Air-bladder present. Pyloric appendages few.

The fishes forming this genus have as a rule very vivid and decided colouring, vertical bands of a more or less white tint being present in the majority and more vivid in the young than in adults, consequently their presence alone should not be accepted as sufficient to constitute a species. The caudal fin seems more rounded in the young than in adults.

Geographical Distribution. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Western Pacific.

Synopsis of Indian Species.

Dull yellow, a dark blotch on side .... 1. *A. ephippium*, p. 376.
Dark, with two white cross bands; caudal yellow. 2. *A. sebæ*, p. 377.
Yellow, three white, black-edged cross bands. 3. *A. percula*, p. 377.
Dark, with two milk-white cross bands; caudal with white upper and lower edges ...... 4. *A. bifasciatus*, p. 378.
Orange, a blue band from snout to dorsal .... 5. *A. acallopistus*, p. 378.

1217. (1.) Amphiprion ephippium. (Fig. 125.)

Lutjanus ephippium, *Bloch, Ich.* iv, p. 121, t. 201, fig. 2.
Amphiprion frenatus, *Brevoort, Amer. Exp. China & Japan*, p. 263, pl. vi, fig. 4.
Anthias clarkei, *Bennett, Fish. Ceylon*, p. 29, pl. 29.
Amphiprion ephippium, frenatus, & clarkii, *Day, Fish. India*, p. 378, pl. lxxx, figs. 1, 2 (see synon.).

D. 10–11/17–15. A. 2/14–15. L. l. 50–55. L. tr. 7/18. Cæc. pyl. 2.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $2\frac{1}{3}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal spines nearly as high as the rays, no notch between the two; caudal more rounded in the immature than in the adult. *Colour*—very various, mostly dull yellow, with a dark blotch on the side which runs into the general colour, outer edge of ventrals brown. The variety *A. frenatus* is

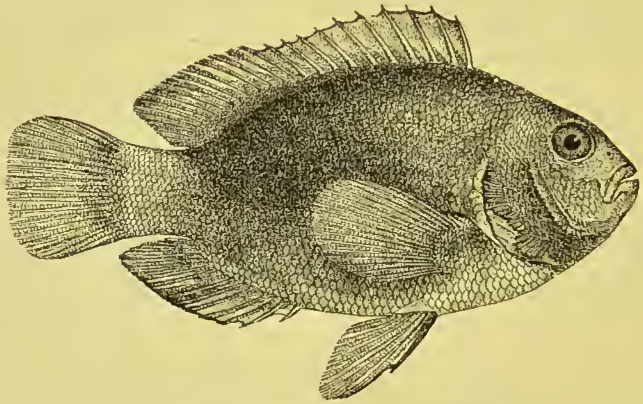

Fig. 125.—*Amphiprion ephippium.*

brownish orange, becoming lighter on abdomen and free portion of tail; a blackish blotch descends from below last dorsal spines and first few rays to middle of sides. A pearl-coloured or bluish band of varying width from nape over opercles; ventrals externally blackish. In the variety *A. clarkii* there are three milk-white cross bands, the first in front of dorsal fin, over opercles; the second from last five dorsal spines to the front of base of anal; the third crosses free portion of tail.

Hab. Andamans and Nicobars, to the Malay Archipelago and Australia, Madagascar, &c.

1218. (2.) Amphiprion sebæ.

Amphiprion sebæ, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 478; *Day, Fish. India,* p. 378, pl. lxxx, fig. 3, *Suppl.* p. 800 (see synon.).

D.10–11/14–15. P.20. A.2/12–13. C.15. L.l.50–55. L. tr. 6/18.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{3}{4}$ to 3 in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, 1 diam. from end of snout and also apart. *Fins*—dorsal spines increasing in length to fourth, which is about $\frac{1}{3}$ length of head, posteriorly they decrease so that the fin is deeply notched, soft dorsal $\frac{1}{3}$ higher than spinous. Caudal cut square, or emarginate in adult. *Colour*—brownish black, with two broad milk-white cross bands, the anterior from nape to subopercle, covering most of the opercle; the second from last three dorsal spines and four first rays to a little in front of vent, superiorly it covers upper third of soft dorsal. End of free portion of tail and caudal fin canary-yellow. A young specimen $\frac{3}{4}$ of an inch in length had snout, muzzle, and chest dull yellow, pectoral greenish, its base black.

Hab. Andamans to the Malay Archipelago.

1219. (3.) Amphiprion percula.

Lutjanus percula, *Lacép. H. N. Poiss.* iv, pp. 239, 240.
Amphiprion percula, *Day, Fish. India,* p. 379, pl. lxxx, fig. 4 (see synon.).

Eá-ole-jo-do-dah, Andam., or "Turtle's stomach," because generally found inside *Actiniæ,* which are looked upon as those organs.

D.10–11/14–15. P.17. A.2/11–12. C.15. L.l.50–60. L.tr.7–8/21–23.

Length of head $3\frac{2}{3}$ to 4, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 diam. from end of snout and also apart. *Fins*—dorsal spines strong, second to fourth highest, but not equalling soft dorsal. Caudal wedge-shaped or rounded. *Lateral line*—ceases below about the fourth dorsal ray, and from the thirtieth to thirty-fourth scale. *Colour*—bright yellow, with three broad milk-white black-edged cross bands, the anterior convex, over hind part of head; the second from middle of dorsal fin to vent, and the posterior one over free portion of tail. Pectoral and caudal deep yellow or brownish yellow, with a broad white edge which has a narrow black base; dorsal and anal yellow, with a white edge having a black base; ventral yellow, the extremity black. In some specimens the posterior white band on body is continued along either side of caudal fin.

Hab. Seas of India, Malay Archipelago and beyond; the Andamans.

1220. (4.) Amphiprion bifasciatus.

Anthias bifasciatus, *Bloch, Ich.* t. 316, fig. 2.
Amphiprion bifasciatus, *Day, Fish. India*, p. 379, *Suppl.* p. 800 (see synon.).

D. 11/13–15. P. 15. A. 2/12–13. C. 17. L. l. 50–55. L. tr. 6/19.

Length of head 4 to $4\frac{1}{2}$, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, $1\frac{1}{3}$ apart. *Lateral line*—tubes cease opposite middle of soft dorsal. *Colour*—brownish black, with two milk-white cross bands; anterior from nape over opercles; second from last three spines and first few dorsal rays down to middle of body, and backward to summit of all dorsal rays; caudal black, upper and lower edge white.

Hab. Andamans to the Malay Archipelago and beyond.

1221. (5.) Amphiprion acallopistus.

Amphiprion akallopisos, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 281.
Amphiprion akallopisus, *Day, Fish. India*, p. 380 (see synon.).

D. 9–10/20–18. P. 19. A. 2/13–14. C. 15. L. l. 60. L. tr. 6/24.

Length of head $3\frac{1}{2}$ to $4\frac{1}{4}$, height of body $2\frac{3}{4}$ to 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. *Fins*—dorsal spines short, increasing in length to fourth, a notch between spinous and soft portions. Caudal rounded. *Colour*—orange, brightest on head, chest, and base of caudal fin; a blue band from between orbits to dorsal fin, there dividing into two, half going along either side of base of fin. Scales on body with a light spot.

Hab. Andamans to Malay Archipelago.

2. Genus **PREMNAS**, Cuv.

Branchiostegals five or six. All the opercles serrated; a long strong spine at posterior edge of preorbital. Teeth in a single row, conical and small. Dorsal with 9 or 10, anal with 2 spines. Scales of moderate size. The lateral line ceases below the end of the dorsal fin. An air-bladder. Pyloric appendages three.

Geographical Distribution. Indian Ocean.

1222. (1.) Premnas biaculeatus. (Fig. 126.)

Chætodon biaculeatus, *Bloch, Ich.* t. 219, fig. 2.
Premnas biaculeatus, *Day, Fish. India*, p. 380, pl. lxxx, fig. 5 (see synon.).

B.v. D.9–10/16–20. A.2/13–15. L.l.60–70. L.tr.14/35. Vert.12/14.

Length of head 4, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter a little above $3\frac{1}{2}$ to 4 in length of head, 1 to $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Preorbital with two strong spines. *Fins*—fourth dorsal spine and second anal longest.

Colour—black or chestnut-brown, fins black-edged. A broad white band margined with black passes over occiput and on to opercles; a second from last three dorsal spines to in front of base of anal; a third over free portion of caudal.

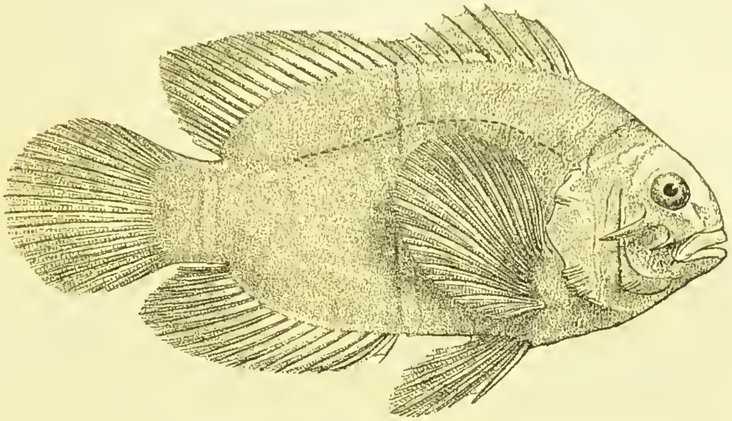

Fig. 126.—*Premnas biaculeatus.*

This fish sometimes uses *Actiniæ* as a hiding-place (De Cresp. P. Z. S. 1869, p. 248).

Hab. Seas of India to the Malay Archipelago and beyond.

3. Genus **TETRADRACHMUM**, Cantor.

Syn. *Dascyllus,* Cuv. (Preoccupied by Latreille (1796), *Coleoptera.*)

Branchiostegals five. Preopercle, and occasionally the preorbital, serrated. Teeth villiform in a narrow band, the outer row somewhat larger. Dorsal with 12 or 13, anal with 2 spines. Scales large or of moderate size. Lateral line ceases in a tubular form below the soft dorsal, but is continued along the middle row of scales as a circular hole in each. Air-bladder large. Pyloric appendages two or three.

Geographical Distribution. Indo-Pacific Ocean.

Synopsis of Indian Species.

Brown, vertical fins dark .... 1. *T. trimaculatum,* p. 379.
Bluish, many scales with a bright blue spot. 2. *T. marginatum,* p. 380.
Pearl-white, with 3 vertical black bands .. 3. *T. aruanum,* p. 380.

1223. (1.) **Tetradrachmum trimaculatum.**

Pomacentrus trimaculatus, *Rüpp. Atl. Fische,* p. 39, pl. viii, fig. 3.
Tetradrachmum trimaculatum, *Day, Fish. India, Suppl.* 1888, p. 801 (see synon.).

D. 12/13–15. A. 2/13–14. L. l. 27. L. tr. 3/11. C. p. 3. Vert. 11/14.

Length of head 4 to $4\frac{1}{2}$, height of body a little over 2 in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout. *Colour*—deep brown; vertical fins dark, becoming black at their edges. A white spot at nape, sometimes wanting, a second above lateral line below middle of dorsal fin.

Hab. Red Sea, east coast of Africa, Ceylon, to Polynesia. Common at Colombo.

1224. (2.) Tetradrachmum marginatum. (Fig. 127.)

Pomacentrus marginatus, *Rüpp. Atl. Fische*, p. 38, t. viii, fig. 2.
Tetradrachmum marginatum, *Day, Fish. India*, p. 381, pl. lxxix, fig. 7, *Suppl.* p. 800 (see synon.).

D. 12/14–16. P. 17. A. 2/12–13. C. 17. L. l. 25–26. L. tr. 3/12.

Length of head $3\frac{1}{2}$ to 4, height of body $1\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{4}$ in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. from end of snout, and 1 apart. Body strongly compressed; the profile, omitting the tail, is nearly orbicular. Preorbital narrow. *Fins*—dorsal spines from the second to the last of about equal length; caudal

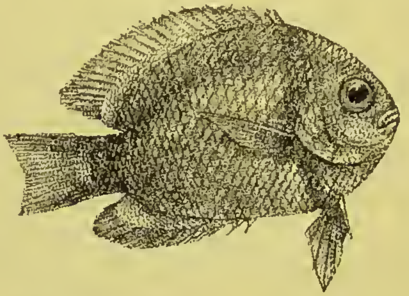

Fig. 127.—*Tetradrachmum marginatum.*

slightly emarginate. *Colour*—bluish. A dark band passes from first two dorsal spines, through base of pectoral to ventral. Snout dark. Every scale on head, chest, and lower two thirds of body, and a few on upper third with a bright blue black-edged spot. Soft dorsal and caudal yellow; spinous dorsal, ventral, and anal black.

Hab. Red Sea, east coast of Africa, Andamans, Malay Archipelago, China, and beyond.

1225. (3.) Tetradrachmum aruanum.

Chætodon aruanus, *Linn. Syst. Nat.* i, p. 464.
Tetradrachmum aruanum, *Day, Fish. India*, p. 381, pl. lxxx, fig. 6 (see synon.).

D. 12–13/12–11. A. 2/11–12. L. l. 25–27. L. tr. 3/10–11. C. pyl. 3.

Length of head 4, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and

1 apart. *Fins*—third dorsal spine and second anal longest. *Colour*—pearl-white, with three vertical black bands, the anterior from first three dorsal spines through eye to under surface of lower jaw; the second from sixth to ninth dorsal spines to the ventral fins, which are black; the third from base of soft dorsal to anal; caudal dark, light posteriorly.

Hab. Red Sea, eastern coast of Africa, seas of India to Polynesia, &c.; numerous at the Andamans, Nicobars, and Burmah, but much rarer in Western than in Eastern India.

4. Genus **POMACENTRUS** (Lacépède), Cuvier.

Syn. *Pristotis*, Rüpp.; *Lepidozygus*, Günther; *Pseudopomacentrus*, Bleeker.

Branchiostegals 4 or 5. Preopercle and usually infraorbital ring serrated. Teeth small, compressed; the crowns smooth or emarginated. Dorsal with 12 or 13, anal with two spines. Scales rather large. Lateral line ceases below the soft dorsal fin. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Tropical seas of both hemispheres.

Synopsis of Indian Species.

A. L. tr. 3-4/9-10½.
 a. Lips moderate.
  Olivaceous; scales with blue spots, 3 to 5 blue lines on forehead, caudal yellow .... 1. *P. trilineatus*, p. 381.
  Greenish yellow; head-scales with blue spots, 3 black blotches on back descending to sides .... 2. *P. trimaculatus*, p. 382.
  Yellowish, two black bands on upper part of each side. Fins yellow .... 3. *P. bifasciatus*, p. 383.
  Deep violet, ends of soft dorsal and caudal yellow .... 4. *P. sindensis*, p. 383.
  Brownish, blue lines on forehead, scales with blue dots, a black ocellus at base of soft dorsal .... 5. *P. littoralis*, p. 384.
  Olive, bluish spots on scales, 3 black spots on each side .... 6. *P. bankanensis*, p. 384.
  Olive, a broad vertical yellowish band under last dorsal spines .... 7. *P. prosopotænia*, p. 384.
  Greyish brown, bluish-white spots on scales, black ocellus at base of soft dorsal, no blue lines on forehead .... 8. *P. lividus*, p. 385.
 b. Lips thick, covered with papillæ and reflected .... 9. *P. labiatus*, p. 385.
B. L. tr. 5/11. Caudal lobes produced, pointed .... 10. *P. jerdoni*, p. 385.

1226. (1.) Pomacentrus trilineatus.

Pomacentrus trilineatus (*Ehr.*), *Cuv. & Val. H. N. Poiss.* v, p. 428; *Day, Fish. India*, p. 382, *Suppl.* p. 801 (see synon.).

B. v. D. 13/15. P. 17. A. 2/16. C. 17. L. l. 28. L. tr. 3/9.

Length of head from 4 to $4\frac{1}{4}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Greatest depth of preorbital equals half diameter of eye. Suborbital ring of bones serrated, two strong denticulations on first bone. Two opercular spines. *Colour*—olivaceous; caudal yellow; each scale with one or two blue spots; three to five blue lines on forehead, the outer of which are continued on to the nape, and sometimes along base of dorsal. A dark round spot on the opercle; a blue-edged black spot across free portion of tail. The immature have a similar spot on anterior third of soft dorsal.

Hab. Red Sea, east coast of Africa, Andamans, Nicobars, Malay Archipelago, and beyond.

1227. (2.) **Pomacentrus trimaculatus.** (Fig. 128.)

Dascyllus trimaculatus, *Cuv. & Val. H. N. Poiss.* v. p. 441.
Pomacentrus trimaculatus, *Day, Fish. India,* p. 382, pl. lxxx, fig. 10 (see synon.).

B. v. D. 13/14–15. V. 1/5. A. 2/13–15. C. 17. L. l. 27–28. L. tr. 4/9.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head, 1 diam. from end of snout and also apart. Preorbital entire, suborbital bones serrated. Greatest depth of preorbital rather above $\frac{1}{2}$ diameter of eye. *Fins*—posterior dorsal spines slightly longer than middle ones; caudal emarginate. *Scales*—a row of small ones along bases of dorsal and anal fins. *Colour*—greenish yellow, with three black

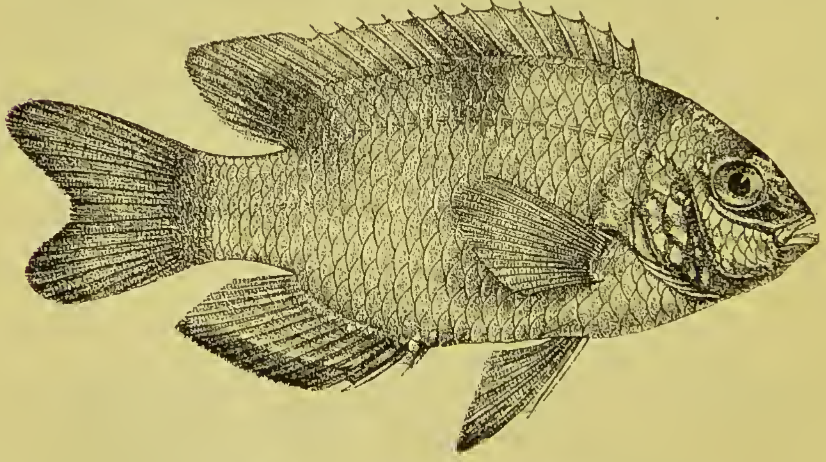

Fig. 128.—*Pomacentrus trimaculatus.*

dorsal blotches, the first extending from origin of dorsal fin to snout, second between 7th and 10th dorsal spines, third from

middle of soft dorsal, both the latter descending to below the lateral line. A light band over nape, and two narrow blue bands from one orbit to the other. A light blue line along suborbital ring of bones, spots on scales covering cheeks, and at bases of dorsal and anal. Dorsal and caudal with a narrow dark edge, anal with a broad dark outer margin, having one or two narrow blue lines along its base.

Hab. Andamans to the Malay Archipelago and beyond. At the Andamans the species is not uncommon.

1228. (3.) Pomacentrus bifasciatus.

Pomacentrus bifasciatus, *Bleeker, Batavia Nat. Tijdsch.* vi, p. 330; *Day, Fish. India,* p. 383 (see synon.).

D. 13/14. P. 17. A. 2/13–14. C. 17. L. l. (25) 28. L. tr. 3/9.

Length of head 4, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ in length of head, $\frac{2}{3}$ diam. from end of snout, and 1 apart. Preorbital and suborbital bones entire. Greatest depth of preorbital not equal to $\frac{1}{2}$ diameter of eye. *Colour*—yellow, a curved blue line on preorbital; a black band from nape over opercles, and a second from last dorsal spines to below lateral line. Fins yellow.

Hab. Andamans and Malay Archipelago.

1229. (4.) Pomacentrus sindensis.

Glyphidodon sindensis, *Day, Sea-fishes of India and Burma,* 1873, p. cclxiii; *Fish. India,* p. 388, pl. lxxxii, fig. 2.
Pomacentrus sindensis, *Day, Fish. India,* p. 748.

D. 13/11–12. P. 19. A. 2/11–13. C. 15. L. l. 26. L. tr. $3\frac{1}{2}$/10.

Length of head $3\frac{3}{4}$ to 4, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Preorbital where widest not $\frac{1}{3}$ diameter of eye in depth, suborbital ring of bones narrow. *Teeth*—in a narrow row, about 50 in upper jaw, their summits notched. *Fins*—dorsal spines increasing to fourth, all behind that about equal; soft dorsal rather produced in centre; caudal forked, upper lobe the longer, and occasionally produced, more especially in the young; soft dorsal and anal scaled. *Colour*—deep violet, extending on to dorsal and anal fins; pectoral hyaline, with a dark mark at its base; ventral nearly black; posterior extremities of dorsal and caudal canary-yellow; all scales on upper part of body and free portion of tail with light blue central spots. Some blue lines about the head in the young, which has also free portion of tail yellow and chest light-coloured.

Hab. Numerous in the harbour at Karáchi in Sind.

1230. (5.) Pomacentrus littoralis.

Pomacentrus littoralis (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* v, p. 425; *Day, Fish. India*, p. 383 (see synon.).

D. 13–14. P. 16. A. 2/14–15. C. 17. L. l. 26–28. L. tr. 3/9.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. from end of snout, and $\frac{2}{3}$ to 1 apart. Preorbital narrow, entire; suborbital bones serrated in the adult, entire in the immature. *Fins*—dorsal spines increase in length behind; caudal slightly emarginate. *Colour*—brownish, two narrow blue lines from back along forehead converging on snout; two more through eye to maxilla. A dark blue mark on opercle; and a line of blue spots along cheeks; each scale with a blue spot; a black white-edged ocellus at base of soft dorsal, and sometimes another across back of tail behind base of dorsal fin. Ventral nearly black.

Hab. Andamans and Nicobars to the Malay Archipelago and beyond.

1231. (6.) Pomacentrus bankanensis.

Pomacentrus bankanensis, *Bleeker, Batavia Nat. Tijdsch.* v, p. 513 *Day, Fish. India*, p. 383.

D. 13/14. P. 18. A. 2/14. C. 15 L. l. 27. L. tr. $3\frac{1}{2}$/9.

Length of head $4\frac{1}{4}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. Greatest depth of preorbital equals $\frac{1}{2}$ diam. of eye. Suborbital bones serrated, anterior denticulation the strongest. *Fins*—dorsal spines increase in length posteriorly; caudal with rounded lobes. *Colour*—olive, with vertical or round bluish spots on scales. A black spot at commencement of lateral line, another at base of pectoral, and a third over free portion of tail.

Hab. Andamans to the Malay Archipelago and Australia.

1232. (7.) Pomacentrus prosopotænia.

Pomacentrus prosopotænia, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 67; *Day, Fish. India, Suppl.* p. 801 (see synon.).
Pomacentrus albofasciatus, *Day, Fish. India*, p. 384, pl. lxxx, fig. 9 (*not Schlegel*).

D. 12–13/15. P. 17. A. 2/13–14. C. 17. L. l. 26. L. tr. 3/9.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{3}$ apart. Preorbital entire, suborbital bones serrated. Greatest depth of preorbital nearly equals diameter of eye. *Colour*—dark olive, with bluish spots on cheeks; a curved blue line below eye, and a broad vertical yellowish band underneath last dorsal

spines; sometimes a black spot on base of last few dorsal rays, and a round white-edged one at base of pectoral.

Hab. Andamans to the Malay Archipelago.

1233. (8.) Pomacentrus lividus.

Chætodon lividus, *Forster, Descr. An. ed. Licht.* p. 227.
Pomacentrus punctatus, *Quoy et Gaim. Voy. Uranie et Phys., Zool.* p. 395, pl. 64, fig. 1; *Day, Fish. India*, p. 384, pl. lxxx, fig. 8.
Pomacentrus lividus, *Day, Fish. India, Suppl.* p. 801 (see synon.).

D. 12–13/15–14. A. 2/13–14. L. l. 27. L. tr. $3\frac{1}{2}$/10. Cæc. pyl. 3.

Length of head $3\frac{1}{4}$ to $3\frac{2}{3}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter from 3 to $3\frac{1}{3}$ in length of head, 1 diam. from end of snout and also apart. Preorbital in adults nearly as deep as long, and equal to diameter of eye; in the immature its depth is not nearly so great. Hind edge of preorbital and suborbital ring serrated. *Fins*—dorsal spines subequal in height but lower than soft dorsal, which is pointed. Caudal emarginate. *Colour*—greyish brown, head with irregular bluish-white dots and one on each scale of the body. A black spot, margined before and behind with white, at base of last six dorsal rays, and usually continued on to back of free portion of tail. Occasionally a dark spot in axil of pectoral.

Hab. Red Sea, Mauritius, Andamans, Nicobars, and Malay Archipelago.

1234. (9.) Pomacentrus labiatus.

Pomacentrus labiatus, *Day, Fish. India*, p. 384, pl. lxxxi, fig. 2.

D. 13/12–13. P. 17. A. 2/13–14. C. 17. L. l. 28. L. tr. $3\frac{1}{2}$/$10\frac{1}{2}$.

Length of head $3\frac{3}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head, 1 diam. from end of snout and also apart. Suborbital ring of bones rough, scarcely serrated. Preorbital scaleless, its greatest depth half diameter of eye. Lips very large, thick, covered with papillæ, and reflected all round the mouth. *Fins*—dorsal spines subequal, shorter than soft dorsal, which is pointed. Ventral reaches anal. Upper lobe of caudal usually slightly the longer. *Colour*—brown, lightest on chest and lower surface of head; fins black. Blue spots on some scales of head, and usually one on centre of each scale in row above lateral line.

Hab. Andamans and Nicobars, growing to $3\frac{1}{2}$ inches in length.

1235. (10.) Pomacentrus jerdoni.

Pomacentrus jerdoni, *Day, Fish. India*, p. 383, pl. lxxx, fig. 7.

B. iv. D. 13/13. P. 17. A. 2/14. C. 17. L. l. 34. L. tr. 5/11.

Length of head 5, height of body $3\frac{3}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1

apart. Preorbital entire, much longer than deep. Opercle with two spines; angle of opercle slightly serrated as well as contiguous portions of subopercle; infraorbital ring narrow, entire, and scaleless. *Fins*—dorsal spines increase in length posteriorly; soft dorsal and anal pointed; caudal lobes, especially the upper, produced; second anal spine longest and strongest; ventral reaches anal. *Colour*—olive, becoming light below; seven rows of light blue spots across gill-cover, one row along suborbitals, and one over snout. A row of light lines along middle of scales on sides. A black spot at base of pectoral. Fins dark-coloured. Base of caudal and the anal barred with light lines.

Hab. Madras, growing to 5 inches in length.

5. Genus **GLYPHIDODON** (Lacépède), Cuvier.

Syn. *Glyphisodon*, Cuv. & Val.; *Euschistodus, Dischistodus, Hypsipops, Pomatoprion, Microspathodon*, Gill.

Branchiostegals five or six. Body short, compressed. Cleft of mouth small. Opercles entire. Teeth compressed and in a single row. Anal with two spines. Scales of moderate size. The tubular portion of the lateral line ceases below the end of the dorsal fin, but is continued in the form of minute circular orifices. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Tropical seas of both hemispheres.

Synopsis of Indian Species.

A. Transverse (vertical) bands on sides.	
L. tr. 4/12. Dull dark bands, broader than interspaces. Black spots on nape	1. *G. sordidus*, p. 386.
L. tr. 4/14	2. *G. leucopleura*, p. 387.
L. tr. $4\frac{1}{2}/12$. Narrow white vertical bands........................	4. *G. notatus*, p. 387.
L. tr. 3/11	6. *G. septemfasciatus*, p. 388.
L. tr. $4\frac{1}{2}/12$. Dark bands narrower than interspaces	7. *G. cœlestinus*, p. 389.
L. tr. 4/11......................	8. *G. bengalensis*, p. 389.
B. No transverse bands.	
a. Caudal lobes, soft dorsal, and anal produced into long points	3. *G. cochinensis*, p. 387.
b. Vertical fins not produced.	
L. tr. 3/10..................	5. *G. melas*, p. 388.
L. tr. $2\frac{1}{2}/9$	9. *G. antjerius*, p. 390.
L. tr. 3/12..................	10. *G. leucogaster*, p. 390.
L. tr. $2\frac{1}{2}/8$..................	11. *G. modestus*, p. 391.

1236. (1.) Glyphidodon sordidus.

Chætodon sordidus, *Forsk. Descr. Anim.* p. 62, no. 87.
Glyphidodon sordidus, *Day, Fish. India*, p. 385, pl. lxxxiii, fig. 1 (see synon.).

Chák-mud-dah, Andam.; *Calamoia pota*, Tel.

D. 13/14-16. A. 2/12-15. L. l. 29. L. tr. 4/12. C. p. 3. Vert. 12/14.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{3}$ apart. Greatest width of preorbital nearly equals diameter of eye, suborbitals about half as wide. *Teeth*—about 36 in upper jaw, their crowns notched. *Fins*—fifth to seventh dorsal spines longest; soft dorsal higher than long; caudal forked. *Colour*—yellowish olive, the fins darker. Five dull bands, broader than interspaces, from dorsal fin down sides, and a sixth, nearly black, over free portion of tail. A black spot at base of pectoral. A row of black spots across nape.

Hab. Red Sea, east coast of Africa, seas of India to China.

1237. (2.) Glyphidodon leucopleura.

Glyphidodon leucopleura, *Day, Fish. India*, p. 385, pl. lxxxiii, fig. 4.

B. v. D. 13/15. P. 17. A. 2/14. C. 15. L. l. 28. L. tr. 4/14.

Length of head $3\frac{1}{2}$, of caudal fin $4\frac{1}{3}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ diam. from end of snout, and $\frac{3}{4}$ apart. Greatest depth of preorbital equals $\frac{1}{3}$ diameter of orbit; suborbital ring very narrow. *Teeth*—with notched summits. *Fins*—third to sixth dorsal spines considerably longer than the last; soft dorsal angular. Caudal slightly lobed, lobes pointed. *Colour*—brownish, with a dark, almost black, band from first half of dorsal fin to ventral; several narrow white vertical bands from back to abdomen. A white-edged black spot on free portion of the tail extending to bases of last three dorsal rays. Ventral and anal black. Caudal yellowish, with dark outer edges.

Hab. Two specimens, about $1\frac{3}{4}$ inches long, from the Andamans.

1238. (3.) Glyphidodon cochinensis.

Glyphidodon cochinensis, *Day, P. Z. S.* 1865, p. 38, *and Fish. India*, p. 386, pl. lxxxi, fig. 1 (see synon.).

B. v. D. 13/12–15. P. 15. A. 2/10–11. C. 15. L. l. 28. L. tr. 3/8.

Length of head from $5\frac{1}{2}$ to 6, of caudal fin $2\frac{1}{2}$ to 3, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Preorbital narrow, about $\frac{1}{3}$ width of orbit. *Teeth*—about 40 in upper jaw, their summits notched. *Fins*—soft portions of dorsal, anal, and caudal lobes much elongate. *Colour*—purplish black, rather lighter on abdomen, edges of scales sometimes with a lighter tinge; pectoral not so dark as other fins.

Hab. Cochin and the Andamans.

1239. (4.) Glyphidodon notatus.

Glyphidodon notatus, *Day, P. Z. S.* 1869, p. 521; *and Fish. India*, p. 386, pl. lxxxiii, fig. 5 (see synon.).

B. v. D. 13/13–14. P. 19. A. 2/13–14. C. 17. L. l. 28–30. L. tr. $4\frac{1}{2}$/12.

Length of head 4 to $4\frac{1}{4}$, of caudal fin 4 to $4\frac{1}{4}$, height of body $2\frac{1}{3}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Greatest depth of preorbital equals $\frac{1}{2}$ diameter of eye; suborbital ring decreases rapidly in width posteriorly. *Fins*—dorsal rays much longer than spines; caudal deeply forked. *Colour*—olive-brown, lighter below; five narrow white bands from back down sides, the first from first dorsal spine to base of pectoral, the second from third spine to middle of ventral, third from seventh spine, fourth from tenth, and fifth over free portion of tail. A black spot at base of pectoral; caudal yellowish.

Hab. Andamans, growing to $3\frac{1}{2}$ inches in length.

1240. (5.) Glyphidodon melas.

Glyphisodon melas (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* v, p. 472.

Glyphidodon melas, *Day, Fish. India, Suppl.* 1888, p. 801 (see synon.).

Nga yanga aphyoo, Arracan.

B. v. D. 13/13–14. A. 2/10–13. C. 17. L. l. 28. L. tr. 3/10.

Length of head 4, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout. *Fins*—dorsal spines rather short, increasing in length posteriorly; soft portion of dorsal and anal somewhat rounded, caudal slightly emarginate. *Colour*—neutral sepia or dusky, with a greenish tinge beneath; fins black or a little diluted at their bases. Scales edged darker.

Hab. Red Sea, east coast of Africa, Burma to the Malay Archipelago.

1241. (6.) Glyphidodon septemfasciatus.

Glyphisodon septemfasciatus, *Cuv. & Val. H. N. Poiss.* v, p. 463.

Glyphidodon septemfasciatus, *Day, Fish. India*, p. 386, pl. lxxxi, fig. 7 (see synon.).

B. v. D. 13/13. P. 17. A. 2/12. C. 17. L. l. 29. L. tr. 3/11.

Length of head $4\frac{1}{4}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diam. from end of snout, and $1\frac{2}{3}$ apart. Greatest depth of preorbital equals $\frac{3}{4}$ diameter of eye. *Fins*—fourth to sixth dorsal spines the longest. Soft dorsal angular, the fifth ray longest; caudal lobes broad, not very emarginate. *Colour*—greenish olive, with seven dark cross bands wider than interspaces: the first, which is indistinct, from summit of head to preopercle; the second from in front of dorsal fin to base of pectoral; the third, fourth, and fifth from the spinous dorsal; the sixth from below soft dorsal; and the seventh over free portion of tail. Spinous dorsal with a black edge and a yellowish band below it. A black spot at base of pectoral.

Hab. Seas of India to China.

1242. (7.) **Glyphidodon cœlestinus.** (Fig. 129.)

Glyphisodon cœlestinus (*Solander*), *Cuv. & Val. H. N. Poiss.* v, p. 464, pl. 135, and ix, p. 508.
Glyphidodon cœlestinus, *Day, Fish. India*, p. 386, pl. lxxxiii, fig. 2 (see synon.).

Rahti potah, Tel.; *Nga koongya*, Arracan.

B. v. D. 13/13. P. 17. A. 2/12–13. C. 17. L. l. 29. L. tr. $4\frac{1}{2}/12$.

Length of head $4\frac{1}{2}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Greatest depth of preorbital equals $\frac{2}{3}$ diameter of eye; sub-orbital ring very narrow. *Teeth*—about 40 in upper jaw, narrow and notched. *Fins*—dorsal spines increase in length posteriorly;

Fig. 129.—*Glyphidodon cœlestinus.*

soft dorsal pointed, its fourth and fifth rays longest. Caudal deeply forked. *Colour*—olive-brown, with five vertical dark cross bands narrower than interspaces. A dark spot at base of pectoral. Outer edge of caudal usually black.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Polynesia.

1243. (8.) **Glyphidodon bengalensis.**

Glyphisodon bengalensis, *Cuv. & Val. H. N. Poiss.* v, p. 458.
Glyphidodon bengalensis, *Day, Fish. India*, p. 387, pl. lxxxiii, fig. 3 (see synon.).

Chák-mud-dah, Andamanese.

B. v. D. 13/12–13. A. 2/11–12. C. 15. L. l. 29–30. L. tr. 4/11.

Length of head $4\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{6}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Greatest depth of preorbital equals diameter of eye. *Teeth*—crowns notched. *Fins*—soft dorsal angular, the

fourth and fifth rays longest. Caudal forked, lobes pointed. *Colour*—dull greenish olive, with seven vertical dark bands extending downwards from the back, the first across the head, the second across the neck, four below the dorsal fin, and one across free portion of tail. A dark edge to spinous dorsal, a dark spot at base of pectoral, and two bands along anal fin.

Hab. Seas of India from Karáchi to the Malay Archipelago and beyond.

1244. (9.) Glyphidodon antjerius.

Glyphisodon antjerius (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss* v, p. 481.

Glyphidodon antjerius, *Day, Fish. India*, p. 387, pl. lxxxi, figs. 4 and 5, *Suppl.* p. 801 (see synon.).

B. v. D. 13/12–13. A. 2/12–13. C. 17. L. l. 26–28. L. tr. $2\frac{1}{2}$/9.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and 1 apart. Preorbital rather broad, its greatest depth about $\frac{1}{2}$ diameter of eye; suborbital ring narrow. *Teeth*—narrow and in two rows. *Fins*—soft dorsal and anal angular. Caudal slightly forked. *Colour*—exceedingly various, the markings being partially or entirely absent in some specimens, and that not merely from age. Cærulean blue above the lateral line, this colour extending on to some scales along the base of the dorsal, and usually terminating at end of soft dorsal by surrounding a black blotch which is sometimes divided into two and sometimes absent altogether. A blue supraorbital line, joining another from opposite side across snout, and several other blue lines around eyes and on cheeks. In some specimens there is a spot of blue on several scales of the body.

Hab. Red Sea, seas of India, Malay Archipelago and beyond.

1245. (10.) Glyphidodon leucogaster.

Glyphidodon leucogaster, *Bleeker, Batav. Genootsch. Verhand.* xxi, *Labr. Cten.* p. 26; *Day, Fish. India*, p. 388, pl. lxxxi, fig. 3 (see synon.).

B. v. D. 13/12–13. A. 2/12–13. C. 17. L. l. 26–28. L. tr. 3/12.

Length of head $4\frac{1}{2}$, height of body $2\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ in length of head, $\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Preorbital with a shallow notch, its greatest width equals nearly 1 diameter of eye; suborbital ring narrow. *Teeth*—about 46 in upper jaw. *Fins*—dorsal spines, after second, subequal in length; soft portion of dorsal rather pointed; anal rounded. Caudal forked, with pointed lobes. *Scales*—cover preorbital and suborbitals. *Colour*—olive-brown, lighter on sides and yellowish on abdomen. Upper edge of dorsal and outer two thirds of anal black, rest of fin and ventral yellow; outer margin of caudal dark. A black spot at base of pectoral.

Hab. Red Sea, east coast of Africa, Nicobars, and Malay Archipelago.

1246. (11.) **Glyphidodon modestus.**

Glyphidodon modestus, *Schleg. Overz. Amphipr. &c. in Verh. Nat. Gesch. Ned. Overz. Bezitt.* p. 23, t. vi, fig. 2; *Day, Fish. India*, p. 388, pl. lxxxi, fig. 6 (see synon.).

B. v. D. 13/12. P. 18. A. 2/12. C. 15. L. l. 23–24. L. tr. $2\frac{1}{2}$/8.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{3}{4}$ to 3 in length of head, $\frac{2}{3}$ to $\frac{3}{4}$ diam. from end of snout, and 1 apart. Greatest depth of preorbital a little more than half diameter of eye; posteriorly the suborbital ring of bones rapidly narrows. *Teeth*—notched at their extremities; about 36 in the upper jaw. *Fins*—dorsal spines gradually increase in length to last, soft dorsal and anal somewhat rounded; caudal slightly cleft and having rounded lobes. *Scales*—none on preorbital or suborbital ring of bones. *Colour*—yellowish olive, lighter on sides and beneath; outer third of dorsal and anal fins greyish; a brownish dot superiorly at base of pectoral.

Hab. Andamans; seas of India and China.

6. Genus **HELIASTES**, Cuv. & Val.

Syn. *Furcaria*, Poey; *Chromis* (sp. Cuv.), Bleeker, 1877.

Branchiostegals five. All the opercles entire. Teeth in the jaws conical, in a narrow and irregular row. Dorsal fin with 12 to 14 spines; anal with two. Lateral line in a tubular form not continued beyond the end of the base of the dorsal fin. Airbladder present. Pyloric appendages two.

1247. (1.) **Heliastes lepidurus.** (Fig. 130.)

Heliases lepisurus, *Cuv. & Val. H. N. Poiss.* v, p. 498.
Heliastes lepidurus, *Günther*, *Catal.* iv, p. 63; *Day*, *Fish. India*, p. 389, pl. lxxxii, fig. 1 (see synon.).

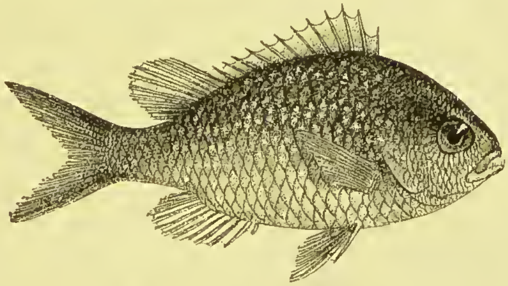

Fig. 130.—*Heliastes lepidurus.*

D. 11–12/10–11. P. 15. A. 2/10. C. 17. L. l. 26–27. L. tr. $2\frac{1}{2}$/9.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{3}{4}$ to 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ to $\frac{1}{2}$ diam. from end of

snout, and 1 apart. *Scales*—on preorbital and suborbitals. *Colour*—olive, each scale with a blue dot; a blue line from eye across preorbital, a blue spot at commencement of lateral line; dorsal dotted with blue, and having a dark edge; anal dotted with yellow, also with a dark margin; caudal with a brownish longitudinal band along either lobe. A dark axillary spot on pectoral; ventrals green.

This fish is very abundant about the coral reefs of the Andaman Islands. It retires for safety to the branching coral, and allows pieces to be removed from the water without leaving them.

Hab. East coast of Africa, Andamans, Malay Archipelago and beyond.

Family XLIII. LABRIDÆ.

Labroidei cycloidei, Müll.; *Scaroidei*, Cantor; *Cyclolabridæ*, Owen.

Pseudobranchiæ present. Gills three and a half. Body oblong or elongate. Teeth in the jaws, palate edentulous; lower pharyngeal bones anchylosed along the median line without any median suture. A single dorsal fin with usually as many spines as rays or more; the anal rays usually similar to those of the dorsal; ventrals thoracic, 1/5. Scales cycloid. Air-bladder present. No cæcal sac to the stomach. Pyloric appendages absent.

Geographical Distribution. Marine members of this family are mostly confined to the seas of tropical and temperate regions, and are generally abundant in the neighbourhood of rocks and coral reefs. The British species are known as Wrasses. Some are provided with strong teeth to enable them to crush the shells of mollusks, and a few have an additional pointed tooth at each angle of the mouth for pressing a shell against the crushing front and lateral teeth.

Synopsis of Indian Genera.

A. Anterior teeth free and (except in *Anampses*) conical.
- *a.* Lateral teeth more or less confluent into a ridge.
  - No scales along bases of fins .... 1. Xiphochilus.
  - Vertical fins with scaly bases .... 2. Chærops.
- *b.* Lateral teeth not confluent.
  - *a'.* Cheeks and opercles scaly.
    - *a''.* Dorsal spines 12 (rarely 13) .... 3. Cossyphus.
    - *b''.* Dorsal spines 9 or 10.
      - *α.* Lateral line continuous .... 4. Labroides.
      - *β.* Lateral line interrupted.
        - Jaws not produced behind .... 5. Chilinus.
        - Lower jaw produced to behind orbit.... 6. Epibulus.
  - *b'.* Head almost or quite scaleless. L. l. 25–30.
    - *a''.* Dorsal spines 9. Lateral line continuous.
      - *α.* Two prominent compressed cutting anterior teeth in each jaw .... 7. Anampses.

β. Cheeks with a row of a few small scales.
Lips very thick .... 8. HEMIGYMNUS.
γ. Anterior teeth not compressed. Cheeks scaleless.
Scales on chest at least as large as on sides .... 9. STETHOJULIS.
Scales on chest smaller than on sides . 10. PLATYGLOSSUS.
b''. Dorsal spines 9, the two first semidetached.
L. l. interrupted .... 11. NOVACULA.
c''. Dorsal spines 8.
Snout moderate .... 12. JULIS.
Snout greatly produced .... 13. GOMPHOSUS.
c'. Head naked. L. l. 45–80. Dorsal spines 9.
a''. Body elongate, nearly cylindrical ...... 14. CHILIO.
d''. Body oblong compressed.
Lateral line continuous .... 15. CORIS.
Lateral line interrupted .... 16. CYMOLUTES.
B. Anterior teeth broad and with cutting lateral edges .... 17. PSEUDODAX.
C. Anterior teeth soldered into a cutting-edge .... 18. SCARICHTHYS.
D. Anterior teeth imbricate .... 19. CALLYODON.
E. Anterior teeth soldered together in quincuncial order.. 20. PSEUDOSCARUS.

1. Genus **XIPHOCHILUS**, Bleeker.

Branchiostegals six. Body oblong; head scaled; snout obtuse; upper lip thin and capable of being almost hidden under the preorbital. Both limbs of the preopercle destitute of scales. Four canine teeth anteriorly in both jaws, lateral teeth soldered into an osseous ridge; a posterior canine tooth present. Scales large. No scales along the bases of the fins. Lateral line continuous.

Geographical Distribution. Indian Ocean.

1248. (1.) **Xiphochilus robustus.**

Xiphochilus robustus, *Günther, Catal.* iv, p. 98; *Day, Fish. India, Suppl.* p. 802 (see synon.).

D. 11–12/9–8. A. 3/10. L. l. 29. L. tr. 3/9.

The following is from Dr. Günther's description:—Height of body nearly $3\frac{2}{5}$, length of head $3\frac{2}{5}$ in the total length. Head nearly as high as long. Preorbital higher than orbit, preopercle not serrated. *Teeth*—outer canines of mandibles turned outwards, an obtuse osseous ridge round the edge of the jaws in which teeth are scarcely distinct. *Fins*—dorsal spines strong, the last longest and one third length of head; soft dorsal and anal reach root of caudal, which is rounded. *Colour*—yellowish red, a yellow band along basal half of anal, and another along middle of dorsal fin.

Hab. One specimen 12 inches long, obtained in Ceylon by Mr. Haly; also Red Sea and Mauritius.

2. Genus CHÆROPS, Rüppell.

Syn. *Cossyphus*, sp., Cuv. & Val.; *Choirodon* and *Cossyphodes*, Bleeker; *Hypsigenys*, Günther.

Branchiostegals five or six. Body oblong, compressed. Snout obtuse. The four anterior teeth conical and free, the lateral ones more or less confluent in an osseous ridge; a posterior canine tooth, occasionally two, may be present. Dorsal fin with more spines than rays; anal with more rays than the soft dorsal. Scales large; cheeks high, covered with small scales, which usually are not imbricate; opercles scaled. Vertical fins with scaly bases; no enlarged row at base of caudal. Lateral line continuous.

Geographical Distribution. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Australia.

1249. (1.) Chærops anchorago. (Fig. 131.)

Sparus anchorago, *Bloch, Ich.* v, p. 108, t. 276.
Chærops anchorago, *Day, Fish. India,* p. 391, pl. lxxxii, fig. 5 (see synon.).

B. vi. D. 13/7. P. 15. A. 3/9. C. 14. L. l. 29–30. L. tr. $3\frac{1}{2}/9$.

Length of head $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—high up, diameter $4\frac{1}{2}$ to 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{4}$ apart. Preopercle finely serrated. *Teeth*—a posterior canine in adults. *Colour*—cheeks brownish, shot with yellow, and covered with scarlet spots. Back

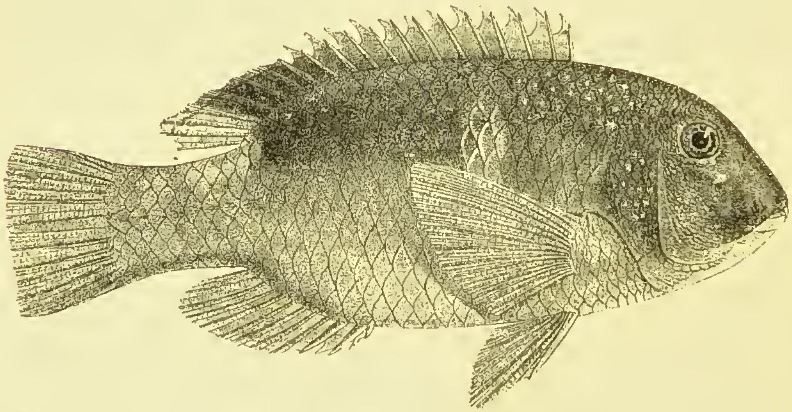

Fig. 131.—*Chærops anchorago.*

brownish, a white vertical band from bases of about fourth to sixth dorsal spines to below last third of pectoral; a light band over free portion of tail. In some specimens there are two to four wide dark cross bands. Dorsal fin with two dark bands and another descending down the first four rays to the back; posteriorly

the fin is yellow and edged with orange; other fins yellowish, a band along ventral and sometimes a brown base to pectoral.

Hab. Andamans to the Malay Archipelago; attaining a large size.

3. Genus **COSSYPHUS**, Cuv. & Val.

Syn. *Harpe, Lepidoplois,* and *Pimelometopon,* Gill.

Branchiostegals six. Body oblong, compressed. Snout more or less pointed. The four anterior teeth conical and free; the lateral teeth in a single row; a posterior canine is as a rule present. Dorsal fin with more spines than rays; the anal with more rays than the soft dorsal. Scales of moderate size, those on the cheeks and opercles imbricate; bases of vertical fins scaled. No enlarged row of scales at base of caudal. Lateral line continuous.

Geographical Distribution. Nearly all intertropical and adjacent seas.

Synopsis of Indian Species.

Orange-red, darkest superiorly .... 1. *C. axillaris*, p. 395.
Reddish, three white spots between the lateral line and base of dorsal fin .... 2. *C. diana*, p. 396.
A black blotch below hind edge of dorsal fin, another between first three dorsal rays .. 3. *C. bilunulatus*, p. 396.

1250. (1.) **Cossyphus axillaris.** (Fig. 132.)

Labrus axillaris, *Bennett, P. Z. S.* 1831, p. 166.
Cossyphus axillaris, *Day, Fish. India,* p. 392, pl. lxxxii, fig. 3 (variety) (see synon.).

Moonjilli, Tamil.

D. 12/10. P. 16. A. 3/12. C. 14. L. l. 34. L. tr. 5/12.

Length of head 4, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{3}$ to $1\frac{2}{3}$ diam. from

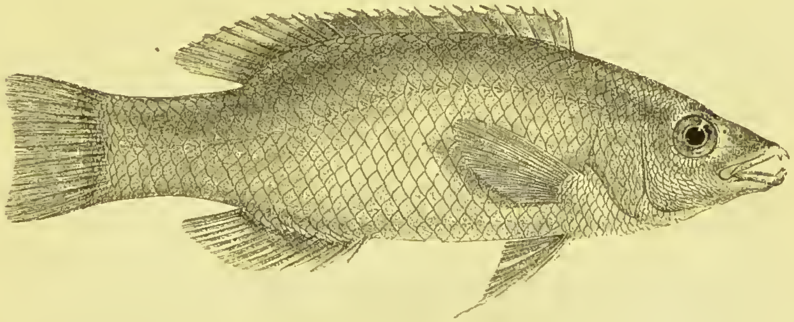

Fig. 132.—*Cossyphus axillaris*, var.

end of snout, and $1\frac{1}{4}$ apart. Upper lip thick and with a broad anterior fold. Preopercle finely serrated. *Teeth*—a posterior

canine present. *Fins*—caudal truncated or slightly emarginate. *Colour*—head and upper two thirds of back orange-red. Fins yellow, a black base to pectoral, and a black blotch on upper two thirds of first few dorsal and anal rays.

Hab. Madagascar, Mauritius, seas of India to New Hebrides.

1251. (2.) Cossyphus diana.

Labrus diana, *Lacép. H. N. Poiss.* iii, pp. 451, 522, pl. xxxii, fig. 1.
Cossyphus diana, *Day, Fish. India*, p. 392, pl. lxxxvii, fig. 3 (see synon.).

Cul monjilli, Tamil.

D. 12/10. P. 16. A. 3/10–12. C. 14. L. l. 32–33. L. tr. 4/12.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{4}$ apart. Snout produced, rather pointed; lips thick and broad; preopercle finely serrated. *Teeth*—a posterior canine in either jaw. *Fins*—no elongate ventral ray; caudal truncated. *Colour*—reddish, three large white spots between lateral line and base of dorsal fin, two below spines and one beneath rays. Dark spots on scales from commencement of soft dorsal to caudal above lateral line; a black spot at posterior end of lateral line; fins diaphanous. *Varieties*—some specimens have a white spot before commencement of lateral line. Others show a large black spot upon each ventral, and two more on the anal fin.

Hab. Seas of India; a specimen $5\frac{1}{2}$ inches long in the Calcutta Museum.

1252. (3.) Cossyphus bilunulatus.

Labrus bilunulatus, *Lacép. H. N. Poiss.* iii, pp. 454, 526, pl. xxxi, fig. 2.
Cossyphus bilunulatus, *Day, Fish. India, Suppl.* p. 802 (see synon.).

D. 12/10. P. 16. A. 3/12. C. 14. L. l. 34.

Length of head $3\frac{2}{3}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, 2 diam. from end of snout. Preopercle finely serrated. *Fins*—caudal emarginate, the outer rays produced. *Colour*—reddish, with light or yellow stripes and a large black blotch below hind edge of soft dorsal and over commencement of free portion of tail. Two black lines on head, one from snout through eye, the second from angle of mouth to subopercle. A black blotch between first three dorsal spines.

Hab. Isle de France, Ceylon (*Haly*) to the Malay Archipelago.

4. Genus LABROIDES, Bleeker.

Diproctacanthus, Bleeker; *Fissilabrus*, Kner.

Branchiostegals five. Body oblong, compressed. Gill-membranes attached to the isthmus. Snout pointed; lips prominent, one of them having a notch anteriorly. Preopercle entire. A band

of small teeth in the jaws, with a pair of curved canines in either jaw, the upper pair being received between the lower ones; a posterior canine tooth. Dorsal fin with usually fewer spines than rays; anal with rays nearly similar to those of the dorsal. Scales extended over the opercles, cheeks, and base of the vertical fins; no enlarged row at base of caudal fin. Lateral line continuous.

Geographical Distribution. Red Sea, seas of India to the Malay Archipelago.

1253. (1.) **Labroides dimidiatus.** (Fig. 133.)

Cossyphus dimidiatus, *Cuv. & Val. H. N. Poiss.* xiii, p. 136.
Labroides dimidiatus, *Day, Fish. India,* p. 393, pl. lxxxvii, fig. 1 (see synon.).

D. 9/10–12. P. 13. A. 3/10. C. 14. L. l. 46–50. L. tr. 4/15.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. Lips emarginate anteriorly. *Fins*—caudal

Fig. 133.—*Labroides dimidiatus.*

cut square. *Lateral line*—curves opposite posterior end of dorsal. *Colour*—nearly white, with a black band through eye to caudal fin; a black band along anal, passing to the caudal and joining the upper band at the end of that fin; a dark band along dorsal.

Hab. Red Sea, Coromandel coast of India, Andamans to the Malay Archipelago.

5. Genus **CHILINUS** (Lacép.), Cuvier.

Oxycheilinus et *Crassilabrus,* Gill.

Branchiostegals five. Body oblong, compressed. Preopercle entire. Lower jaw not produced backwards. Teeth in one row, two canines in either jaw, not directed outwards; no posterior canine. Dorsal spines about equal in number to the rays. Anal with three spines, the third longest, the rays rather fewer than those of the dorsal. Scales large, two rows on the cheeks, the last three scales at the base of the caudal fin enlarged. Lateral line interrupted.

Geographical Distribution. Indo-Pacific.

Synopsis of Indian Species.

A. D. 10/9. Ventral extending to anal rays . . 1. *C. chlorurus*, p. 398.
B. D. 8-9/10. Ventral not extending to anal.
Greyish brown, red spots and stripes on head . . . . 2. *C. trilobatus*, p. 398.
Yellowish with dark transverse bands . . 3. *C. fasciatus*, p. 399.
Bluish green above, reddish below, narrow bands on head and chest . . . . 4. *C. undulatus*, p. 399.

1254. (1.) **Chilinus chlorurus.** (Fig. 134.)

Sparus chlorurus, *Bloch, Ich.* v, p. 24, t. 260.
Cheilinus chlorurus, *Day, Fish. India*, p. 393, pl. lxxxii, fig. 6 (see synon.).

D. 10/9. P. 11. A. 3/8. C. 12. L. l. 22. L. tr. 2/8.

Length of head $3\frac{3}{4}$, of caudal fin $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $4\frac{3}{4}$ in length of head, $1\frac{1}{3}$ diam. from end of snout and also apart. *Fins*—ventral reaches anal rays; outer caudal rays produced, causing the fin to appear three-lobed; it is sometimes rounded in the young. *Lateral line*—tubes much

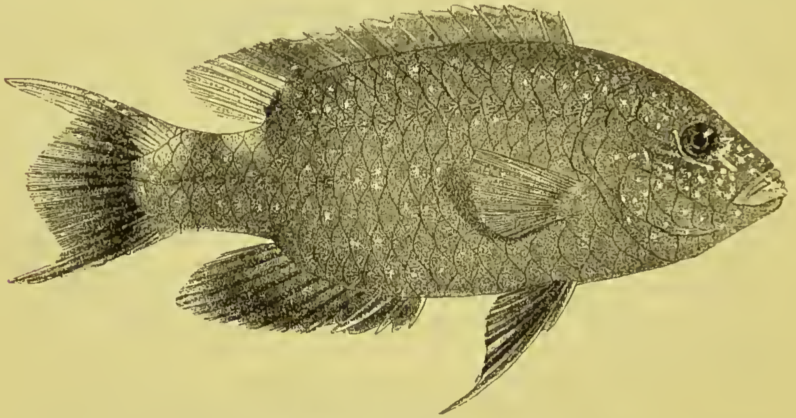

Fig. 134.—*Chilinus chlorurus.*

branched. *Colour*—olive-brown, with round yellow spots on cheeks and a yellow streak from eye to angle of mouth; body sparingly dotted with yellow, a yellow mark covers last few dorsal rays and is continued on to the back of free portion of tail; spinous dorsal olive, with red edges, and spines with brown dots; soft dorsal reddish; anal, ventral, and caudal with small yellow dots.

Hab. Bay of Bengal to Malay Archipelago and beyond.

1255. (2.) **Chilinus trilobatus.**

Cheilinus trilobatus, *Lacép. H. N. Poiss.* iii, pp. 529, 537, t. 31, fig. 3; *Day, Fish. India*, p. 394, pl. lxxxii, fig. 4 (see synon.).

D. 9/10. P. 12. A. 3/8. C. 13. L. l. 20. L. tr. $2\frac{1}{2}$/7.

Length of head $3\frac{3}{5}$, of caudal fin 7, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diam. from end of snout and also apart. Profile over snout rather concave. *Fins*—ventral does not reach anal; caudal rounded except in large specimens, when it is usually trilobed. *Lateral line*—tubules branched. *Colour*—greyish brown, with red spots and narrow stripes on head, the stripes mostly before and below the eyes; some of the body-scales with red spots. Vertical fins green, dorsal and anal having red margins; a dark spot at base of middle dorsal rays, sometimes extending to the posterior one.

Hab. Red Sea, east coast of Africa, Andamans, Malay Archipelago and beyond; growing to at least 3 feet in length.

1256. (3.) Chilinus fasciatus.

Sparus fasciatus, *Bloch, Ich.* v, p. 18, t. 257.
Cheilinus fasciatus, *Day, Fish. India,* p. 394, pl. lxxxiv, fig. 1 (see synon.).

D. 9/10. A. 3/8. C. 13. L. l. 21–23. L. tr. 2/7. Vert. 10/13.

Length of head $3\frac{1}{2}$, of caudal fin $4\frac{2}{3}$, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter 5 in length of head, 2 diam. from end of snout and also apart. Outer end of maxilla curved forwards in a hook-like process to receive outer extremity of premaxillary. *Fins*—ventral rounded, not reaching anal; caudal truncated, having its upper and lower rays produced. *Lateral line*—tubules unbranched. *Colour*—yellowish, with six or seven dark or black transverse bands; black spots on nape, opercles, and pectoral region, also some scattered over the body. Caudal with a crescentic vertical black band, and a black posterior edge, a few narrow dark bands between the two. Dorsal with a light edge having a dark base, some body-bands extended on to this fin. A large black blotch on ventral.

Hab. Red Sea, seas of India, Malay Archipelago and beyond.

1257. (4.) Chilinus undulatus.

Cheilinus undulatus, *Rüpp. N. W., Fische,* p. 20, t. vi, fig. 2; *Day, Fish. India, Suppl.* p. 802 (see synon.).

D. 8–9/10. A. 3/8. C. 11. L. l. 22–23. Vert. 9/14.

Length of head $3\frac{1}{3}$, of caudal fin $5\frac{1}{2}$, height of body about 3 in the total length. *Eyes*—diameter 6 in length of head and situated about middle of its length. Head having a hump in some old specimens; lips thick. *Fins*—ventrals not quite so long as pectorals; caudal rounded. *Lateral line*—tubes not branched. *Colour*—bluish green, anterior half of body below lateral line reddish, also the cheeks. Two narrow dark bands from eye to snout, between them is a yellow one; two similar bands pass backwards from eye. Many narrow red and yellow lines on head and chest, and dark undulating bands on fins; outer edge of caudal yellow.

Hab. Red Sea, Zanzibar, Ceylon, Malay Archipelago.

6. Genus **EPIBULUS**, Cuvier.

Branchiostegals five. Body oblong, compressed. Preopercle entire. Mouth very protractile, the ascending processes of the premaxillaries, also the mandibles and tympanics, elongate. Teeth in one row, two canines in either jaw, but no posterior canine. Dorsal fin with fewer spines than rays; anal rays less numerous than dorsal. Scales large, two rows on cheeks, three enlarged scales at base of caudal fin. Lateral line interrupted.

Geographical Distribution. Seas of India to Malay Archipelago.

1258. (1.) **Epibulus striatus.** (Fig. 135.)

Epibulus striatus, *Day, P. Z. S.* 1870, p. 697; *Fish. India*, p. 395, pl. lxxxvii, fig. 2 (see synon.).

D. 9/10. P. 11. V. 1/5. A. 3/8. C. 13. L. l. 19. L. tr. 2/7.

Length of head above $2\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and apart. *Fins*—interspinous membrane prolonged beyond both dorsal and anal spines. *Colour*—a white line between orbits; a second from eye to snout; a third descending from each orbit meets one from

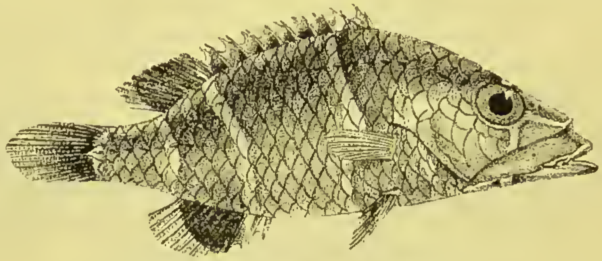

Fig. 135.—*Epibulus striatus.*

opposite side. Body greenish brown, with five narrow milk-white vertical bands, the first from opercles to before ventrals, the next from second dorsal spine to end of ventral, the third from dorsal to anal, the fourth from end of dorsal to end of anal, the fifth round free portion of tail. Soft dorsal and termination of anal white, remainder of fins dark-coloured.

Hab. Andamans, where a single specimen $1\frac{1}{2}$ inches in length was captured.

7. Genus **ANAMPSES**, Cuvier.

Branchiostegals six; body oblong, compressed. Preopercle entire. Teeth in jaws in one row, the two front teeth in each prominent, directed forwards, and compressed, with cutting-edges; no posterior canine. Dorsal spines fewer than the rays; anal with the same number of rays as the dorsal. No scales on the head, no enlarged row at base of caudal fin. Lateral line continuous.

Geographical Distribution. Indo-Pacific.

1259. (1.) Anampses cæruleopunctatus. (Fig. 136.)

Anampses cœruleopunctatus, *Rupp. Atl Fische,* p. 42, t. x, fig. 1; *Day, Fish. India,* p. 395, pl. lxxxvii, fig. 4 (see synon.).

D. 9/12. A. 3/12. C. 13. L. l. 27–28. L. tr. 4/18. Vert. 11/15.

Length of head $3\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 2 apart. *Colour*—reddish brown, several bluish lines radiate from orbit: each scale on body with a blue spot surrounded by a

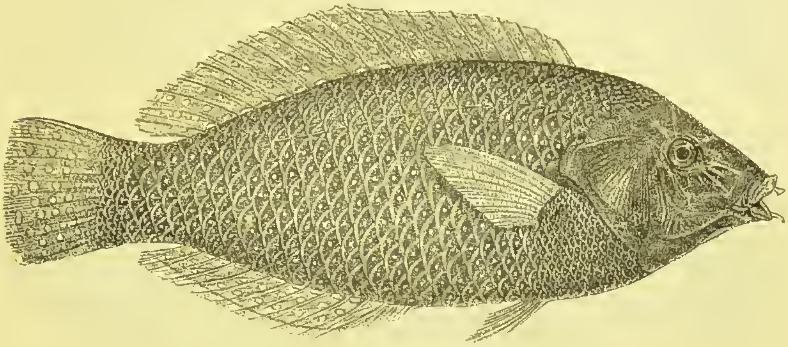

Fig. 136.—*Anampses cœruleopunctatus.*

dark ring; fins reddish, dorsal with three rows of blue spots, anal with two or three, caudal likewise blue-spotted, all these fins with light edges. The spots on the middle of the body are sometimes apt to assume the appearance of vertical lines.

Hab. Red Sea, east coast of Africa, Mauritius, seas of India, Malay Archipelago and beyond.

8. Genus **HEMIGYMNUS**, Günther.

Syn. *Halichœres,* sp., Rüppell; *Tautoga,* sp., Cuv. & Val.; *Erychthys* and *Hemiulis,* Swainson.

Branchiostegals six; body oblong, compressed. Preopercle entire; lips very fleshy. Teeth in a single row, two canines anteriorly in either jaw, the lower ones received between the upper pair; generally a posterior canine. Dorsal fin with fewer spines than rays; anal with the same number of rays as the soft dorsal. Scales large, none on the opercles, but a strip of very small ones on the cheek. Lateral line continuous.

Geographical Distribution. Indo-Pacific.

Synopsis of Indian Species.

L. tr. 5/14. Scales dotted with blue ...... 1. *H. melanopterus,* p. 402.
L. tr. 5/11. Bluish, with wide vertical bands. 2. *H. fasciatus,* p. 402.

1260. (1.) Hemigymnus melanopterus. (Fig. 137.)

Labrus melapterus, *Bloch, Ich.* t. 285.
Hemigymnus melanopterus, *Günther, Catal.* iv, p. 139; *Day, Fish. India*, p. 396, pl. lxxxiv, fig. 2 (see synon.).

D. 9/11. P. 13. A. 3/10. C. 15. L. l. 27–29. L. tr. 5/14.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body $2\frac{3}{4}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in the young, to 6 or $6\frac{1}{2}$ in length of head in adults, 2 to 3 diam. from end of snout, and $1\frac{1}{2}$ to 2 apart. Lips very thick, the lower notched in middle, each lateral portion pendent like a wattle. *Colour*—bluish, brown above, yellowish beneath; a dark mark behind orbit; scales dotted with blue; dorsal and anal light at their external third, followed by a bluish band, edged

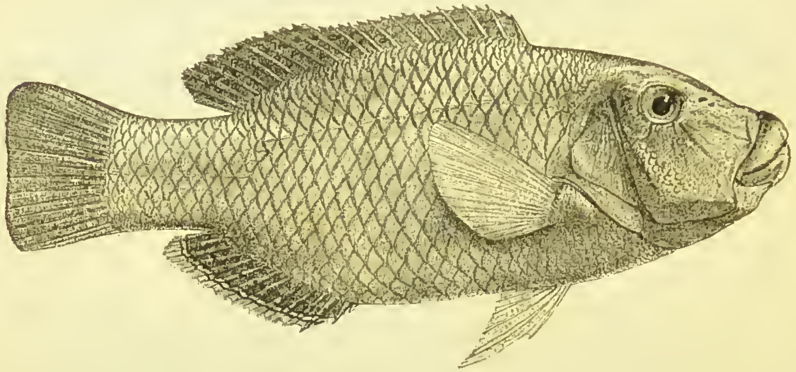

Fig. 137.—*Hemigymnus melanopterus.*

darker; caudal dark. In the *young*, the body behind a line from commencement of dorsal to base of anal dark violet, some of the lower scales blue-spotted; anterior to this nearly white beneath, but darker along top of head; most of the scales with more or less dark spots.

Hab. Zanzibar, Andamans, Malay Archipelago, and Australia.

1261. (2.) Hemigymnus fasciatus.

Mullus fasciatus, *Thunb. Reise nach Japan*, iv, p. 351, t. 314.
Hemigymnus fasciatus, *Günther, A. M. N. H.* 1861, ser. 3, viii, p. 386; *Day, Fish. India*, p. 396 (see synon.).

Panoo-girawah, "Worm parrot," Singhalese.

D. 9/11. P. 14. A. 3/11. C. 14. L. l. 28–29. L. tr. 5/11.

Length of head $3\frac{2}{3}$ to 4, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to 6 in length of head, nearly 3 diam. from end of snout. Lips very thick, folded; lower notched in middle and pendent like a wattle. *Fins*—caudal truncated. *Colour*—bluish, with broad rivulated red bands on head, and a brown spot behind the eye; these marks appear to be sometimes absent. Five vertical brownish cross bands, wider than ground-colour, descend from back to the abdomen. Dorsal and anal brownish, the former with blue

spots and a blue edge, having a red band below it; anal with two blue longitudinal bands. Caudal brownish, with a blue vertical band. Pectoral yellowish. Outer two thirds of ventral dark.

Hab. Red Sea, east coast of Africa, seas of India and Malay Archipelago.

9. Genus **STETHOJULIS**, Günther.

Syn. *Julis*, sp., Cuv. & Val.

Branchiostegals six; body oblong and compressed. Preopercle entire; no anterior canine teeth; a posterior canine; dorsal fin with fewer spines than rays; anal with the same number of rays as the soft dorsal. Scales of moderate size, of equal dimensions on chest and sides; none on the head. Lateral line continuous.

Geographical Distribution. East coast of Africa to Western Pacific.

1262. (1.) **Stethojulis strigiventer.** (Fig. 138.)

Julis strigiventer, *Bennett, P. Z. S.* 1832, p. 184.
Stethojulis strigiventer, *Günther, A. M. N. H.* 1861, ser. 3, viii, p. 386; *Day, Fish. India*, p. 397, pl. lxxxiv, fig. 7 (see synon.).

D. 9/11. P. 15. A. 2/11. C. 14. L. l. 26–27. L. tr. 2/9.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ to 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Colour*—light brown, yellowish on abdomen; a brown band having a white lower edge from

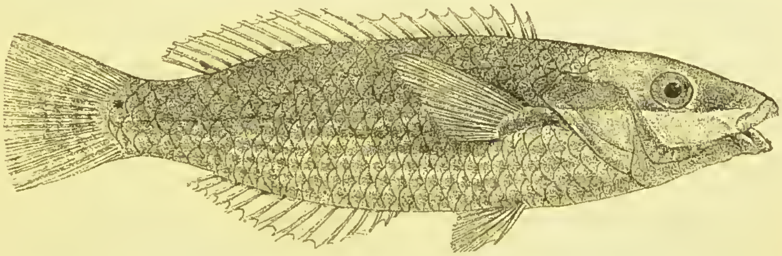

Fig. 138.—*Stethojulis strigiventer.*

snout below eye to opercle; several longitudinal yellow lines and some black dots along sides, especially in lower half of body; a black spot on last dorsal ray, another at base of caudal fin, the last sometimes absent.

Hab. East Africa, seas of India, Malay Archipelago, and China; very abundant at the Nicobars and Andamans.

10. Genus **PLATYGLOSSUS** (Klein), Günther.

Syn. *Halichœres*, sp., Rüppell: *Julis*, sp., Cuv. & Val.: *Macropharyngodon*, *Güntheria*, and *Hemitautoga*, Bleeker; *Chœrojulis*, Gill.

Branchiostegals six. Body oblong, compressed. Anterior teeth conical; a posterior canine. Dorsal fin with fewer spines than

rays; anal with about the same number of rays as the soft dorsal. Scales rather large; those on the thorax smaller than on the remainder of the body; none on the head (except a few rudimentary ones behind the eye in two or more species). Lateral line continuous.

Geographical Distribution. Tropical and adjacent seas.

Synopsis of Indian Species.

L. tr. 3/11. Purplish brown, red longitudinal bands, 2 black spots on dorsal	1. *P. notopsis*, p. 404.
L. tr. 2/12. A brownish-black band along back, another along lateral line	2. *P. hyrtlii*, p. 405.
L. tr. 3½/10. Blackish green. Undulating blue-edged grass-green streaks on head and fore part of body	3. *P. marginatus*, p. 405.
L. tr. 3/10. Bluish green, violet bands on head, a dark ocellus on spinous dorsal ..	4. *P. dussumieri*, p. 405.
L. tr. 3½/8. Longitudinal silvery bands on sides; 2 black spots on dorsal	5. *P. leparensis*, p. 406.
L. tr. 2½/9. Broad bluish streaks on head, fore part of back with blue spots	6. *P. hortulanus*, p. 406.
Head with blue lines and spots, each scale below l. l. with rosy centre	7. *P. kawarin*, p. 407.
L. tr. 3/12. Body with light and dark blotches and spots; 2 dark spots on dorsal......	8. *P. nebulosus*, p. 407.
Blue spot behind orbit, oblique red streaks on head..........................	9. *P. javanicus*, p. 408.
L. tr. 2½/10. A broad red, blue-edged band along side.........................	10. *P. scapularis*, p. 408.
L. tr. 4/9. Violet bands round eye. An angular, black, white-edged spot in middle of side	11. *P. bimaculatus*, p. 409.
Rosy, a large black spot behind middle of eye.	12. *P. roseus*, p. 409.
Olive, about 13 longitudinal dark lines on side.	13. *P. metager*, p. 409.

1263. (1.) Platyglossus notopsis.

Julis (Halichœres) notopsis, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 290.
Platyglossus notopsis, *Day, Fish. India*, p. 398, pl. lxxxiv, fig. 4 (see synon.).

D. 9/13. P. 13. A. 3/12. C. 14. L. l. 27–29. L. tr. 3/11.

Length of head 4 to 4½, height of body 3½ to 3⅔ in the total length. *Eyes*—diameter 3½ in length of head, about 1 diam. from end of snout and also apart. *Fins*—dorsal spines two thirds height of rays; caudal rounded. *Colour*—purplish brown, with four or five red longitudinal bands. Two black ocelli on dorsal fin; the smaller between 1st and 2nd spines, the larger between 3rd and 6th rays; one or two rows of round light spots on fin posterior to large black spot. Caudal with a yellow band at its base, and yellow edges. Young much darker than adults, having light longitudinal narrow lines and three white spots on back.

Hab. Andamans to the Malay Archipelago.

1264. Platyglossus hyrtlii.

Julis (Halichœres) hyrtlii, *Bleeker, Act. Soc. Sc. Ind. Ned.* i, *Menado*, p. 60.
Platyglossus hyrtlii, *Day, Fish. India*, p. 398, pl. lxxxviii, fig. 1 (see synon.).

D. 9/12–13. P. 14. A. 3/12. C. 14. L. l. 27–28. L. tr. 2/12.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter 5 in length of head, nearly 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—caudal rounded. *Colour*—back olive, abdomen white; two brownish-black longitudinal bands—the upper along each side of base of dorsal fin; the lower from snout through eye to middle of base of caudal fin, where it ends in a black spot, in its course it is interrupted on the opercle by a bright red spot. Dorsal fin anteriorly with two, posteriorly with three rows of spots, the reticulations forming which are very distinct between the first and third spines. Caudal similarly reticulated. Pectoral with a dark spot superiorly at its base.

Hab. Andamans to the Malay Archipelago.

1265. (3.) Platyglossus marginatus.

Halichœres marginatus, *Rüpp. N. W., Fische*, p. 16.
Platyglossus marginatus, *Day, Fish. India*, p. 398, pl. lxxxiv, figs. 5 and 6 (variety) (see synon.).

D. 9/12–13. P. 13. A. 3/11. C. 15. L. l. 27. L. tr. $3\frac{1}{2}$/10.

Length of head $4\frac{1}{3}$ to $4\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{2}{3}$ to 2 diam. from end of snout, and $1\frac{1}{3}$ apart. Dorsal profile somewhat concave above orbits. *Fins*—caudal slightly rounded. *Colour*—blackish green; head and anterior part of body with undulating grass-green streaks edged with blue. Numerous red blue-edged streaks and spots on vertical fins, which have blue margins; a large vertical green crescent-shaped mark covered with light spots on middle of caudal fin, basal half of pectoral black. *Variety*—a specimen captured at the Andamans has the marks on the head and body deep brown, the crescentic band on caudal envelops the whole of it except its outer angles, and instead of being covered with light spots has brown undulating vertical bands. The black base to the pectoral is absent.

Hab. Red Sea, seas of India, and Malay Archipelago.

1266. (4.) Platyglossus dussumieri.

Julis dussumieri, *Cuv. & Val. H. N. Poiss.* xiii, p. 478, pl. 387.
Platyglossus dussumieri, *Day, Fish. India*, p. 399, pl. lxxxv, fig. 1 (see synon.).

Kullaray meen, Mal.; *Chikoti*, Maráthi.

D. 9/12. P. 15. A. 3/12. C. 15. L. l. 28–29. L. tr. 3/10.

Length of head 4 to $4\frac{1}{3}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{3}$ diam. from end of snout, and 1 apart. *Fins*—first ray of ventral prolonged; caudal rounded. *Colour*—green, some irregular violet bands between eyes, and one from them to snout; two or three over the opercles; back bluish, checkered with dull purplish red. A black spot with a light anterior edge at base of pectoral. Dorsal and anal greenish, an oval yellow spot between the bases of each two rays, and another near their summits, soft portions with a broad purplish external margin; a blackish ocellus, with a yellow edge, between fifth and seventh dorsal spines. Caudal with a broad blue transverse band having red spots, angles orange with a red base.

Hab. East coast of Africa, seas of India, Malay Archipelago and beyond.

1267. (5.) **Platyglossus leparensis.**

Julis (Halichœres) leparensis, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 730.
Platyglossus leparensis, *Day, Fish. India*, p. 399, pl. lxxxiv, fig. 3 (see synon.).

D. 9/12. P. 14. A. 3/12. C. 15. L. l. 26–28. L. tr. $3\frac{1}{2}$/8.

Length of head 4, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. *Fins*—caudal rounded. *Colour*—a broad brown streak from eye to snout, and a brown spot behind orbit, continued, but in a lighter shade, to the tail; four narrow curved yellowish lines on upper portion of opercle. Body vertically banded; 5 or 6 narrow silvery lines along sides, the upper from the eye; many scales with brown spots, especially those above lateral line. Dorsal fin with one or two rows of light round spots and two black ocelli, the anterior between first two spines, the posterior between first two or three rays, occasionally a third ocellus on upper third of free portion of tail; caudal fin yellowish red.

Hab. Andamans to the Malay Archipelago.

1268. (6.) **Platyglossus hortulanus.** (Fig. 139.)

Labrus hortulanus, *Lacép. H. N. Poiss.* iii, p. 518, t. xxix, fig. 2.
Platyglossus hortulanus, *Day, Fish. India*, p. 399, pl. lxxxv, fig. 3 (see synon.).

Hembili-girwah, "Basket-parrot," Singhalese.

D. 9/11–12. P. 15. A. 3/11. L. l. 28. L. tr. $2\frac{1}{2}$/9. Vert. 10/15.

Length of head $3\frac{3}{4}$ to 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{2}$ apart. *Fins*—caudal truncated. *Colour*—yellowish brown, broad bluish oblique bands on the head, anterior portion of back

with bluish spots. One (sometimes two or three) yellow spots on back below fourth dorsal spine, and sometimes a black spot behind it. Oblique brown streaks on dorsal fins, sometimes enclosing

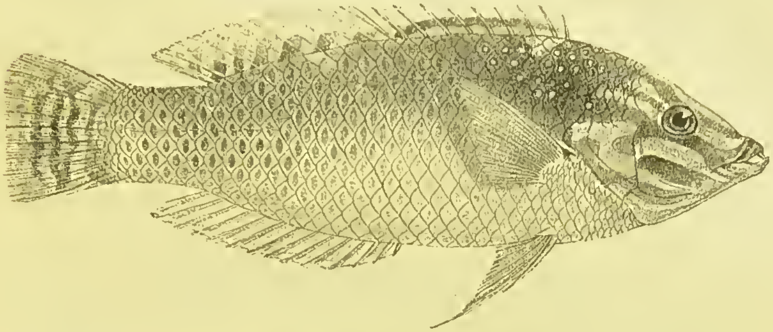

Fig. 139.—*Platyglossus hortulanus.*

spaces; a black axillary spot, usually another at upper part of base of caudal, which is sometimes spotted or vertically banded; anal with longitudinal bands.

Hab. Red Sea, east coast of Africa, Andamans, Malay Archipelago, and Polynesia.

1269. (7.) Platyglossus kawarin.

Julis (Halichœres) kawarin, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 172.
Platyglossus kawarin, *Day, Fish. India*, p. 400 (see synon.).

D. 9/11. P. 14. A. 3/11. C. 14. L. l. 28–29.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 2 diam. from end of snout, and 1 apart. *Fins*—caudal slightly rounded. *Colour*—head with a bluish band from eye to snout; a second from angle of mouth along posterior edge of orbit to upper part of head; a third from interopercle; a blue blotch on centre of opercle, and a wide light-blue band above; some blue spots on summit of head. Sides below lateral line blue, each scale with a central rosy spot, forming seven longitudinal bands. Dorsal and anal blue, with three rows of round reddish spots, and a black spot on the dorsal spine and the first and second rays; caudal yellowish, dark-edged.

Hab. Andamans to the Malay Archipelago.

1270. (8.) Platyglossus nebulosus.

Julis nebulosus, *Cuv. & Val. H. N. Poiss.* xiii, p. 461.
Platyglossus nebulosus, *Day, Fish. India*, p. 400, pl. lxxxv, fig. 2 (see synon.).

D. 9/11. P. 14. A. 3/11. C. 14. L. l. 28. L. tr. 3/12.

Length of head $3\frac{3}{4}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*

—diameter 4 in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 apart. *Fins*—caudal rounded. *Colour*—olivaceous; several violet bands on head; opercular lobe violet; from it to the tail a dark band, giving off above and below short branches, between which are silvery spots, there are others along base of dorsal fin; some oblique silvery streaks covered by pectoral. A minute black spot between first two dorsal spines, and a larger one between first two rays; two or three red ocelli margined with blue between the dorsal spines and oblique violet bands ascending forwards; anal with a band along its middle and ocelli at its base; caudal occasionally with black dots.

Hab. Red Sea, seas of India, and Malay Archipelago.

1271. (9.) Platyglossus javanicus.

Julis (Halichœres) javanicus, *Bleeker, Batavia Nat. Tijdsch.* xiii, p. 341.

Platyglossus javanicus, *Day, Fish. India, Suppl.* p. 803 (see synon.).

D. 9/12. P. 15. A. 3/12. C. 12. L. l. 28.

Length of head $3\frac{2}{3}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{2}{3}$ diam. from end of snout, and $\frac{3}{4}$ to 1 diam. apart. *Fins*—spines of dorsal fin not so high as rays; caudal rounded. *Colour*—brownish red, becoming silvery along abdomen, a vertical blue spot or band behind upper half of orbit; some oblique red streaks on head; a black spot superiorly at base of pectoral. Dorsal fin reddish, with two or three rows of round yellowish spots; caudal of a similar colour, but the spots irregularly disposed. Anal fin reddish.

Hab. Singapore, and Colombo, Ceylon (*Haly*).

1272. (10.) Platyglossus scapularis.

Julis scapularis, *Benn. P. Z. S.* 1831, p. 167.

Platyglossus scapularis, *Day, Fish. India*, p. 400, pl. lxxxv, fig. 4 (see synon.).

D. 9/11. P. 15. A. 3/11. C. 15. L. l. 27. L. tr. $2\frac{1}{2}/10$.

Length of head $3\frac{1}{4}$ to $4\frac{1}{4}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—outer ray of ventral elongate; caudal rounded. *Colour*—a broad red blue-edged band from snout to eye; a second irregular one obliquely upwards from eye to wide lateral band, which is brownish violet in colour, and passes from shoulder to tail; a red streak from axilla to abdomen, many scales on body with blue spots; dorsal and anal margined with a green blue-edged band. Caudal with reddish-violet transverse sands.

Hab. Red Sea, east coast of Africa, seas of India, and Malay Archipelago.

1273. (11.) Platyglossus bimaculatus.

Halichœres bimaculatus, *Rüpp. N. W., Fische*, p. 17, t. v, fig. 2.
Platyglossus bimaculatus, *Day, Fish. India*, p. 401, pl. lxxxv, fig. 5 (see synon.).

D. 9/10. P. 13. A. 3/11. C. 14. L. l. 27. L. tr. 4/9.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{2}$ apart. *Fins*—caudal truncated, outer rays slightly produced. *Colour*—yellowish, greenish round lower edge of eye, with violet-coloured bands radiating from it; a broad dark-green band from eye to caudal fin, and a row of light spots above it. A triangular black white-edged spot on ninth or tenth scale of lateral line, continued downwards in a more diffused form. Upper edge of dorsal fin yellow, with a narrow, purplish, intramarginal line, its lower two thirds reddish, with two rows of round bluish spots edged with yellow; a dark wide band along middle of anal. Caudal vertically rivulated with green, and light edged. This species varies in colour, the ocelli on the vertical fins becoming bands and *vice versâ*.

Hab. Red Sea, east coast of Africa, and seas of India.

1274. (12.) Platyglossus roseus.

Platyglossus roseus, *Day, P. Z. S.* 1888, p. 264; *Fish. India, Suppl.* p. 803.

D. 9/12. P. 14. A. 3/12. C. 14. L. l. 28. L. tr. $2\frac{1}{2}$/10.

Length of head $4\frac{1}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. *Fins*—caudal slightly rounded; outer ventral ray somewhat elongate. *Scales*—on chest smaller than on body. *Colour*—in a spirit-specimen rosy, a large black spot behind middle of eye, and a small one between first two dorsal spines; two narrow light bands from eye to snout; a broad orange band along sub-orbital ring of bones; body with dark narrow horizontal bands in its anterior half, and seven dark and wider bands from back down sides. A narrow light band from eye to middle of caudal fin. Basal third of caudal fin somewhat dark, its outer edges light.

Hab. Karáchi in Sind.

1275. (13.) Platyglossus metager.

Platyglossus metager, *Day, Fish. India, Suppl.* 1888, p. 802 (Julis metager, *Tickell, MSS.*).

D. 9/13. V. 1/5. A. 3/12.

Length of head $4\frac{3}{4}$, height of body $3\frac{1}{6}$ in the total length, according to the figure. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{2}{3}$ diam. from end of snout. *Teeth*—posterior canine large. *Fins*—dorsal moderately elevated, in its highest portion about one third height

of body, and similar to the anal. Caudal rounded. *Colour*—body and fins a deep olive bistre, body longitudinally striated with about thirteen lines of sepia. An olongated black patch having a greyish-white margin filling up middle half of dorsal fin from eleventh to fifteenth ray. Caudal tawny, with a wide central and vertical brown band. *Young*—caudal tawny white, with a band of pale Indian red.

Hab. Saddle Island off Kyoukhpyoo, Arakan; tho largest specimen taken was about 4 inehes long.

11. Genus **NOVACULA**, Cuv. & Val.

Syn. *Xyrichthys*, sp., Cuv. & Val.

Branchiostegals six; body oblong, compressed; head also compressed, its upper edge sharp or obtuse. Anterior teeth conical; no posterior canine. Dorsal fin single, with fewer spines than rays, the first two spines sometimes more or less separated from the others. Scales rather large; the head may be entirely scaleless, or the cheeks with two or more rows of small seales. Lateral line interrupted.

Geographical Distribution. Tropical and warm temperate seas.

Synopsis of Indian Species.

A. Two rows of minute scales below and behind eye .... 1. *N. rufa*, p. 410.
B. Eight or nine rows of scales on cheeks below eye.
  A row of spots behind the eye .... 2. *N. pentadactyla*, p. 411.
  No spots behind eye .... 3. *N. punctulata*, p. 411.

1276. (1.) Novacula rufa. (Fig. 140.)

Novacula rufa, *Day, P. Z. S.* 1873, p. 238; *Fish. India*, p. 402, pl. lxxxv, fig. 6 (see synon.).

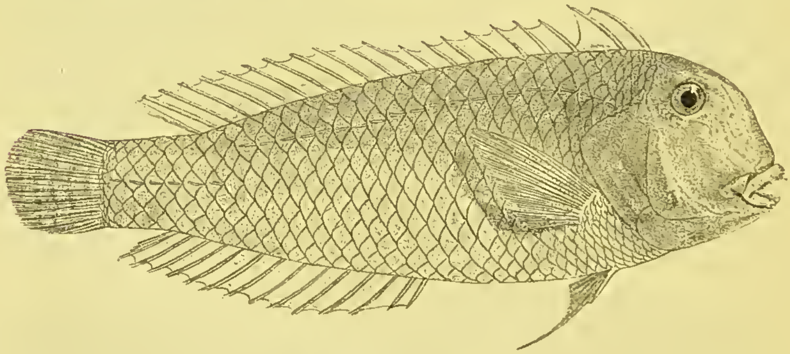

Fig. 140.—*Novacula rufa.*

D. 2 | 7/12. P. 14. A. 3/12. C. 14. L. l. 26. L. tr. 5/13.

Length of head $3\frac{1}{2}$, height of body nearly 3 in the total length. *Eyes*—high up, above 2 diam. from end of snout; some small scales behind and below orbit. Body strongly compressed; anterior edge of head sharp. *Fins*—first two dorsal spines produced, and a deep notch in interspinous membrane behind them. Outer ventral ray produced. *Colour*—rosy, becoming yellowish on abdomen; fins yellowish, except caudal, which has dark greyish reticulated bands.

Hab. Seas of India.

1277. (2.) Novacula pentadactyla.

Coryphæna pentadactyla, *Linn. Syst. Nat.* i, p. 447.
Novacula pentadactyla, *Cuv. & Val. H. N. Poiss.* xiv, p. 69, pl. 395; *Day, Fish. India,* p. 402 (see synon.).

D. 2 | 7/12. P. 12. A. 3/12. C. 12. L. l. 28.

Length of head 4 to $4\frac{1}{4}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—high up, $\frac{1}{2}$ a diameter from dorsal profile, $4\frac{1}{2}$ diam. in length of head, 2 to $2\frac{1}{2}$ from end of snout. Height of head hardly exceeds its length. Profile from snout to forehead nearly vertical. *Fins*—first two dorsal spines remote from the rest and longer, interspinous membrane behind them cleft almost to its base. Outer ventral ray rather elongate. Caudal rounded. *Scales*—8 or 9 rows from eye to behind angle of mouth. *Colour*—light reddish brown, a row of five or six round red spots behind eye, most scales on body with a red basal spot; a blackish blotch on side of body just below lateral line above end of pectoral. Oblique narrow blue lines on dorsal, two horizontal ones along anal, and several vertical ones on caudal.

Hab. Bombay, Malay Archipelago, and China.

1278. (3.) Novacula punctulata.

Novacula punctulata, *Cuv. & Val. H. N. Poiss.* xiv, p. 73; *Day, Fish. India,* p. 402, pl. lxxxviii, fig. 2 (see synon.).

Chilacka-sani-muyya, Tamil.

D. 2 | 7/12. P. 11. A. 3/12. C. 14. L. l. 27. L. tr. 4/13.

Length of head $4\frac{2}{3}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—high up, about 3 diameters from end of snout. Profile from snout to forehead very abrupt. Height of head exceeds its length by one third. *Fins*—first two dorsal spines separated by a cleft from remainder of the fin; ventral reaches the anal. Caudal rounded. *Scales*—cheeks with about 8 rows. *Colour*—brownish, a dark spot on side above end of pectoral, most of the scales on body with a blue spot or streak and reddish base; anterior profile bluish; fins orange, two blue bands along dorsal, and three along anal, also numerous oblique greyish bands; vertical blue bands on caudal.

Hab. Seas of India to China.

12. Genus JULIS, Cuv. & Val.

Branchiostegals six. Body oblong and compressed; snout not produced. Anterior teeth conical; no posterior canine. Dorsal fin with fewer spines than rays; anal with about the same number of rays as the soft dorsal. Scales large, none on the head. Lateral line continuous.

Geographical Distribution. Tropical and adjacent seas.

Synopsis of Indian Species.

Greenish; six vertical black cross bars on back	1. *J. dorsalis*, p. 412.
Body green, each scale with a vertical red streak	2. *J. lunaris*, p. 413.
Back brown, abdomen white, each scale with a vertical streak	3. *J. amblycephalus*, p. 413.
Greenish; scales with vertical streaks, dark-edged violet bands on opercles, pale band behind shoulder in young	4. *J. hebraica*, p. 413.
Green or blue, with longitudinal red or violet bands	5. *J. purpurea*, p. 414.
Yellow, with broad black transverse bands	6. *J. jansenii*, p. 414.

1279. (1.) Julis dorsalis. (Fig. 141.)

Julis dorsalis, *Quoy & Gaim. Voy. Astrol. Zool.* iii, p. 713, *Atlas, Poiss.* pl. xv, fig. 5; *Day, Fish. India*, p. 403, pl. lxxxv, fig. 7 (see synon.).

D. 8/13. P. 14. A. 3/11. C. 15. L. l. 26–29. L. tr. 3/11.

Length of head $3\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ to 2 diam. from end of snout, and $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. *Fins*—caudal lobes somewhat produced. *Colour*—greenish, abdomen silvery. Broad red bands radiate from the eyes; six vertical black cross bars along back,

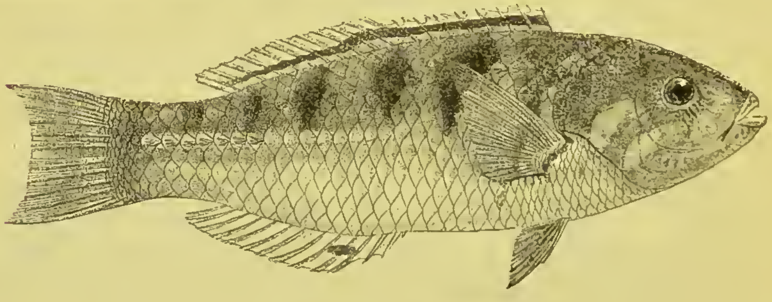

Fig. 141.—*Julis dorsalis.*

extended on to middle of body; a black spot in axilla; a red band along side to tail; usually a black or a very dark blue band on dorsal fin; anal with a black spot anteriorly; caudal with a greyish semilunar band in its posterior half.

Hab. East coast of Africa, seas of India, Malay Archipelago, China, and Polynesia.

1280. (2.) Julis lunaris.

Labrus lunaris, *Linn. Syst. Nat.* i, p. 474.
Julis lunaris, *Day, Fish. India*, p. 403, pl. lxxxvi, fig. 1 (see synon.).

D. 8/13. P. 14. A. 2/11. C. 14. L. l. 28. L. tr. $2\frac{1}{2}$/10.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{2}{3}$ diam. from end of snout, and 1 apart. *Fins*—caudal deeply lunate in adult. *Colour*—head violet, with several oblique reddish bands; body green, each scale with a vertical red streak; an oblong reddish-violet spot on pectoral. Dorsal red, with a blue and yellow margin; anal violet, with a yellow edge; caudal yellow, its base and lobes green. The *young* have a black spot at base of dorsal rays, some light blotches along the back, and a black spot at root of caudal fin.

Hab. Red Sea, east coast of Africa, Andamans, Malay Archipelago, China, and Polynesia.

1281. (3.) Julis amblycephalus.

Julis amblycephalus, *Bleeker, Batavia Nat. Tijdsch.* xi, p. 83; *Day, Fish. India*, p. 404 (see synon.).

D. 8/13. P. 14. A. 2–3/11. C. 14. L. l. 27. L. tr. 2/9.

Length of head $4\frac{1}{3}$ to 5, height of body 5 to $5\frac{1}{3}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{3}$ in length of head, $1\frac{1}{2}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. *Fins*—outer caudal rays produced. *Colour*—upper two thirds of head and body olive-brown, each scale having a vertical streak; lower third of body white; a narrow blue dark-edged line from lower angle of orbit to axilla; a second across angle of preopercle; a broad triangular spot in axil of pectoral, which fin is yellow with a blackish extremity. Dorsal fin dark anteriorly, becoming a little lighter posteriorly, the soft portion having a narrow white edge; caudal lobes dark olive.

Hab. Ceylon to the Malay Archipelago.

1282. (4.) Julis hebraica.

Labrus hebraicus, *Lacép. H. N. Poiss.* iii, pp. 455, 526, pl. xxix, fig. 3.
Julis hebraica, *Day, Fish. India*, p. 404, pl. lxxxvi, fig. 2 (see synon.).

D. 8/13. P. 14. A. 2/11. C. 15. L. l. 27–28. L. tr. 2/9.

Length of head 4 to $4\frac{1}{4}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{2}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diam. from end of snout, and 1 apart. *Fins*—caudal lobes produced in the adult. *Colour*—in the *young* (*J. hebraica*) greenish, each scale having a vertical dark mark. A wide violet dark-edged band from eye downwards, a second backwards to base of pectoral, and a third from upper edge of eye to occiput. A buff-coloured dark-edged cross band from first two dorsal spines to behind ventral. Dorsal fin with a dark ocellus between first and third spines; a

semilunar vertical band on middle of caudal fin. In the adult (*J. genivittata*) there is no light cross band. The pectoral has a dark spot, most intense at edge of fin.

Hab. Red Sea, east coast of Africa, seas of India and beyond.

1283. (5.) **Julis purpurea.**

Scarus purpureus, *Forsk. Descr. Anim.* p. 27, no. 12.
Julis purpurea, *Day, Fish. India*, p. 404, pl. lxxxvi, fig. 3 (see synon.).

Lena-girawah, "Squirrel-parrot," Singhalese; *Chilatrasani*, Tel.

D. 8/13. P. 16. A. 3/11. C. 14. L. l. 27–28. L. tr. 3–$3\frac{1}{2}$/10.

Length of head $3\frac{3}{4}$, height of body $3\frac{3}{4}$ to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 to $6\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to $2\frac{1}{2}$ diam. from end of snout, and $1\frac{3}{4}$ to 2 apart. *Fins*—caudal lobes produced in adult. *Colour*—green or blue, with or without irregular pinkish or red bands radiating from the eye; a red or pink band, often branched above, from opercle to caudal fin, a second of a brownish-violet colour goes along back to upper margin of caudal, and a third along abdomen to lower margin; sometimes there is a fourth from chest to end of base of anal; rays of caudal fin green and the membrane red and violet. Dorsal green or yellow, with a broad pink blue-edged band along its middle, and sometimes a black spot anteriorly; anal green, with a dark basal band; posterior half of pectoral blackish. In the variety *umbrostygma* the colour is greenish, becoming dull white along lower third of body. Head with black lines and scattered spots. Two reddish lines united by branches along the side of the body. Occiput and body with small vertical brown spots. The dorsal and anal fins are occasionally differently coloured; each may have a single green band along its middle, or a red band having yellow marks above and below, with a brown blue-edged intramarginal band.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, China, and beyond.

1284. (6.) **Julis jansenii.**

Julis jansenii, *Bleeker, Act. Soc. Sc. Ind. Ned.* i, *Menado*, p. 56; *Day, Fish. India*, p. 405, pl. lxxxvi, fig. 4.

D. 8/13. P. 15. A. 2/11. C. 14. L. l. 28. L. tr. 2/9.

Length of head 4 to $4\frac{1}{2}$, height of body $4\frac{1}{3}$ to $4\frac{2}{3}$ in the total length. *Eyes*—diameter 6 in length of head, $2\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{3}$ apart. *Fins*—caudal rounded in young, lobes produced in adult. *Colour*—yellow, with from three to five wide black vertical bands from back down sides. In some specimens the black colour almost hides the yellow, and both are continued on to the dorsal fin. A violet streak from behind opercle on to base of pectoral. Pectoral, ventral, and anal yellowish, the last with a black spot at end of last two rays.

Hab. Andamans, Malay Archipelago and beyond.

13. Genus **GOMPHOSUS**, Lacépède.

Branchiostegals six. Body oblong, compressed. Snout produced, tubiform; cleft of mouth short; preopercle entire. Gill-membranes attached to the isthmus. Anterior teeth conical; no posterior canine. Dorsal fin with fewer spines than rays. Anal with fewer rays than the soft dorsal. Scales rather large, none on the head; base of dorsal and anal scaly. Lateral line continuous.

Geographical Distribution. Red Sea and Indian Ocean, extending to Polynesia.

Synopsis of Indian Species.

Violet or vivid green	1. *G. cæruleus*, p. 415.
Brownish, vertical fins dark	2. *G. pectoralis*, p. 416.
Greenish or brownish, a wide yellow band on shoulder to behind pectoral	3. *G. tricolor*, p. 416

1285. (1.) **Gomphosus cæruleus.** (Fig. 142.)

Gomphosus cæruleus, *Lacép. H. N. Poiss.* iii. p. 101, t. v, fig. 1, & t. vi, fig. 1; *Day, Fish. India*, p. 406, pl. lxxxviii, fig. 3 (see synon.).

Nil-talapat-girawah, Singhalese.

D. 8/13. P. 15. A. 2-3/11. C. 14. L. l. 29. L. tr. 3/10.

Length of head 3, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—situated rather behind middle of head. *Teeth*—the two anterior in upper jaw curved and much longer than the remainder. *Fins*—caudal with its outer rays much produced in adults. *Colour*

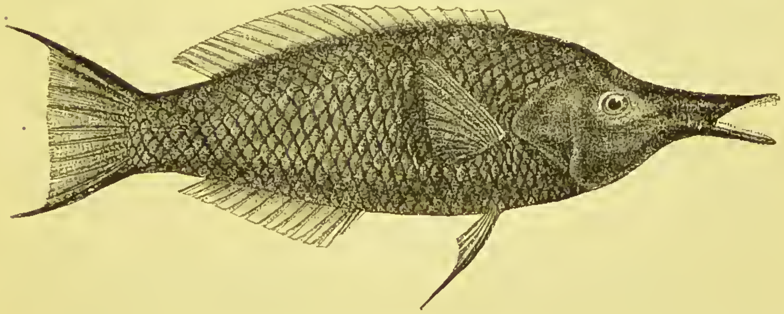

Fig. 142.—*Gomphosus cæruleus.*

—sometimes violet, with vertical fins yellow, dorsal and anal with blue edges; upper and lower margins of caudal blue; or else vivid green, outer edges of dorsal and anal lighter, also posterior extremity of caudal and inner rays of ventral.

Hab. Seas of India to the Malay Archipelago.

1286. (2.) **Gomphosus pectoralis.**

Gomphosus pectoralis, *Quoy & Gaim. Voy. Uranie et Phys., Zool.* p. 282; *Day, Fish. India*, p. 405, pl. lxxxvi, fig. 6 (see synon.).

Koppara girawah, Singhalese.

D. 8/13. P. 15. A. 2–3/11. C. 14. L. l. 26. L. tr. 2/11.

Length of head $2\frac{3}{4}$ to 3, height of body $4\frac{1}{2}$ to $4\frac{2}{3}$ in the total length. *Eyes*—diameter 6 to $6\frac{1}{2}$ in length of head, 3 diam. from end of snout, and 1 apart. *Fins*—caudal rounded or truncated in the young, outer rays slightly produced in adults. *Colour*—upper part of head and back reddish brown, abdomen lighter; each scale darkest at its base; cheeks pinkish. A dark band from snout through eye. Pectorals yellow; vertical fins dark, deep brown externally, with a very narrow light edge; caudal the same, with a black margin and a rather wider white border; ventrals whitish, the outer ray brown. A row of round transparent spots along base of anal.

Hab. Mauritius, Ceylon, Andamans, to the Malay Archipelago.

1287. (3.) **Gomphosus tricolor.**

Gomphosus tricolor, *Quoy & Gaim. Voy. Uranie et Phys.* p. 280, *Atlas*, pl. lv, fig. 2; *Day, Fish. India*, p. 406 (see synon.).

D. 8/13. P. 16. A. 2–3/11. L. l. 28–29. L. tr. 3/9. Vert. 9/15.

Length of head $3\frac{3}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes* rather high up, and situated midway between angle of mouth and end of opercle. *Fins*—outer caudal rays rather produced. *Colour*—brownish or greenish, a broad yellow band from shoulder to behind base of pectoral. Vertical fins yellow; pectoral brownish, a dark spot at its base, and a narrow vertical bluish band parallel with its posterior border.

Hab. Seas of India and Ceylon to the Western Pacific.

14. Genus **CHILIO** (Commerson), Lacépède.

Branchiostegals six. Body elongate and nearly cylindrical. Snout somewhat propuced; preopercle serrated in the young. Teeth in a single row, posterior teeth in the lower jaw compressed and small; no posterior canine. Dorsal spines flexible, fewer than the rays; anal with fewer rays than the dorsal. Scales of medium size; head naked, except a row of rudimentary scales on the opercle; no enlarged row at base of caudal fin. Lateral line continuous.

Geographical Distribution. East coast of Africa to Western Pacific.

1288. (1.) **Chilio inermis.** (Fig. 143.)

Labrus inermis, *Forsk. Descr. Anim.* p. 34, no. 27.
Cheilio inermis, *Day, Fish. India*, p. 407, pl. lxxxviii, fig. 4 (see synon.).

D. 9/13–14. P. 12. A. 3/12. C. 13. L. l. 45–50. L. tr. 3/17.

Length of head $3\frac{1}{2}$, height of body 9 to 10 in the total length. *Eyes*—diameter 6 in length of head, $2\frac{2}{3}$ diam. from end of snout, and 1 apart. *Colour*—brownish superiorly, divided by a darker band (from eye to middle of tail) from a silvery-white lower surface; some black spots along this lateral band. Irregular blue

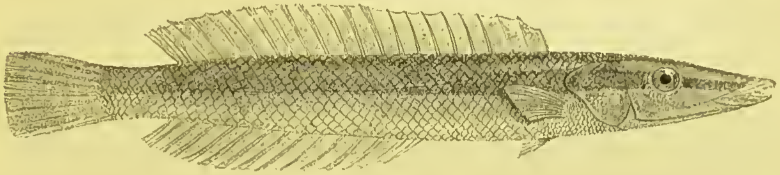

Fig. 143.—*Chilio inermis.*

streaks on head and anal, two or three rows of blue spots on dorsal. In some the lateral band ceases at the opercles or is entirely absent. Scales on body may have blue or brown centres or dark edges.

Hab. Red Sea, east coast of Africa, seas of India to Malay Archipelago and beyond.

15. Genus **CORIS**, Lacépède.

Syn. *Hologymnosus* et *Labrus*, sp., Lacép.; *Halichœres*, sp., Rüppell; *Julis*, sp., Cuv. & Val.; *Pseudocoris*, *Hemicoris*, et *Ophthalmolepis*, Bleeker.

Branchiostegals six; body oblong, compressed. Anterior teeth conical; a posterior canine may be present. Dorsal spines fewer than rays; anal with about the same number of rays as the soft dorsal. Scales rather small, none on the head (except in *C. lineolata*). Lateral line continuous.

Geographical Distribution. Red Sea, throughout the seas of India to Australia and Polynesia, also in the Mediterranean and adjacent parts of the Atlantic.

Synopsis of Indian Species.

A. Anterior dorsal spine prolonged.
  L. tr. 8/35. Grey, with blue spots.......... 1. *C. formosus*, p. 418.
  L. tr. 6/28. Brown or green .... 2. *C. aygula*, p. 418.
  L. tr. 3/27. Vinous red, each scale with an emerald-green spot .... 3. *C. halei*, p. 419.
B. Anterior dorsal spine not produced .... 4. *C. annulatus*, p. 419.

1289. (1.) Coris formosus.

Labrus formosus, *Bennett, Fish. Ceylon*, p. 16, pl. 16.
Coris formosa, *Day, Fish. India*, p. 407, pl. lxxxvi, fig. 5 (see synon.).

Rattoo-girawah, Singhalese.

D. 9/12. P. 14. A. 3/12. C. 14. L. l. 74–84. L. tr. 8/35.

Length of head $4\frac{3}{4}$, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 6 in length of head, 2 diam. from end of snout, and $1\frac{1}{3}$ apart. *Teeth*—a posterior canine at angle of mouth. *Fins*—first spine of dorsal fin elongate. Caudal rounded. *Colour*—bluish grey with circular black spots; head yellow, with two oblique blue bands ascending towards origin of dorsal, one from snout passing through eye, the other parallel, running below eye. Dorsal and anal fins brown, the former with a red margin and with two green lines running within the red; black dots between the rays. Anal with a narrow green edge and a narrow green intra-marginal line; a series of green dots within the margin. Inner half of caudal red, outer yellowish white. Or the lines on the head may be violet, with but one ascending from the eye; body brownish violet, covered posteriorly with scattered blue spots. Fins yellowish, dorsal and anal with a blue margin and a blue black-edged intramarginal band, blue spots along bases of fins. A reddish vertical band sometimes occurs on middle third of caudal fin.

Hab. East coast of Africa, Ceylon, Malay Archipelago and beyond.

1290. (2.) Coris aygula.

Coris aygula, *Lacép. H. N. Poiss.* iii, p. 96, t. iv, fig. 1; *Day, Fish. India*, p. 408 (*not* pl. lxxxviii, fig. 5) (see synon.).

Tik-girawah, Singhalese.

D. 9/12. P. 14. A. 3/12. C. 15. L. l. 60. L. tr. 6/28.

Length of head $3\frac{3}{4}$ to 4, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—small in adult, a prominent knob on dorsal profile above them. Upper lip broad, with folds, and not continuous with the lower one, which is pendent. *Teeth*—a posterior canine if present small and mostly concealed. *Fins*—anterior dorsal spines elevated in adult; ventrals elongate; caudal rounded. *Colour*—the immature have head and anterior part of body olive-brown, occasionally with two brown blotches, small blue spots over the head, and a black spot on the opercle; a black axillary spot and a pale cross band opposite end of pectoral; behind buff, sometimes with red or brown blotches on back and free portion of tail. Vertical fins brown, with black spots and white edges, or with a wide yellow margin. The *adult* darkish or deep green, occasionally two or three red angular bands across the neck; edges of preopercle

sometimes red, a blue mark on extremity of opercle. Sometimes a light vertical band on body from last two dorsal spines to vent. Vertical fins greenish, with a red intermarginal band, and sometimes oblique red blotches along the base.

Hab. Red Sea, seas of India, New Hebrides.

1291. (3.) **Coris halei.**

Coris halei, *Day, Fish. India, Suppl.* 1888, p. 803.

B. vi. D. 9/12. V. 1/5. A. 3/12. L. l. 75. L. tr. 3/27.

"Height of body $3\frac{3}{4}$ in the total length, length of head 4. *Fins*—anterior dorsal spine long, equal to height of body. *Colour*—body vinous-red, barred by eleven purplish-grey stripes; each scale with a spot of brilliant emerald-green. Head orange, with violet, red-bordered stripes radiating from the eye; two of these unite to form a broad band descending from fourth dorsal spine, past eye and mouth, to subopercle. A broad red band on edge of opercles. Dorsal red-grey, anal vinous-red, each with an orange border and covered with small blue spots. Caudal dark grey, with large blue, black-edged spots."—*Haly*, Taprobanian, p. 165.

Hab. Ceylon.

1292. (4.) **Coris annulatus.** (Fig. 144.)

Labrus annulatus, *Lacép. H. N. Poiss.* iii, pp. 455, 526, pl. xxviii, fig. 3.

Coris annulata, *Günth. Catal.* iv, p. 202.

Coris aygula, *Day, Fish. India*, pl. lxxxviii, fig. 5 (*not* p. 408).

D. 9/12. A. 3/12. L. l. 120.

Length of head $4\frac{1}{4}$, height of body nearly 6 in total length. Upper lip broad, folded; the lower broad, pendent, not continuous with that on other side. *Teeth*—no posterior canine. *Fins*—

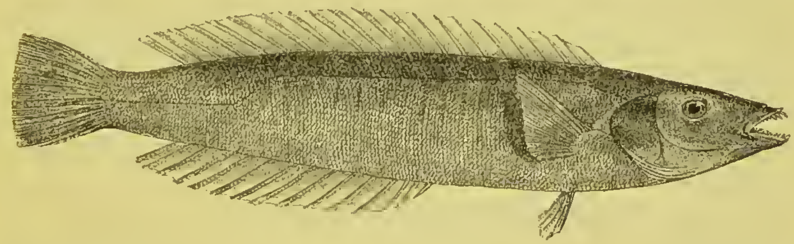

Fig. 144.—*Coris annulatus.*

anterior dorsal spines not produced; ventrals pointed, not prolonged, much shorter than pectorals. *Colour*—variable, vertical bands or stripes on the body, head with rather irregular green bands. Basal half of dorsal sometimes spotted with white.

Hab. Indian Ocean from East Africa to the Malay Archipelago.

16. Genus **CYMOLUTES**, Günther.

Syn. *Xyrichthys*, sp., Cuv. & Val.

Branchiostegals six; body oblong, compressed. Snout rather elevated. Anterior teeth free; no posterior canine. Dorsal with fewer spines than rays; anal with an equal number of rays to the soft dorsal. Head naked; scales small. Lateral line interrupted.

Geographical Distribution. East coast of Africa, seas of India to the Malay Archipelago.

1293. (1.) **Cymolutes prætextatus.** (Fig. 145.)

Julis prætextata, *Quoy & Gaim. Voy. Astrol.* iii, p. 712, *Atlas, Poiss.* pl. xv, fig. 4.
Cymolutes prætextatus, *Day, Fish. India*, p. 409, pl. xc, fig. 1 (see synon.).

D. 9/12. P. 13. V. 1/5. A. 3/12. C. 13. L. l. 73.

Length of head 4 to $4\frac{1}{3}$, height of body $4\frac{1}{3}$ in the total length. *Eyes*—high up, near dorsal profile, diameter $4\frac{1}{2}$ in length of head, 2 diam. from end of snout, and 1 apart. Lower jaw slightly the longer. *Colour*—greenish, a dark blue-edged band across shoulder.

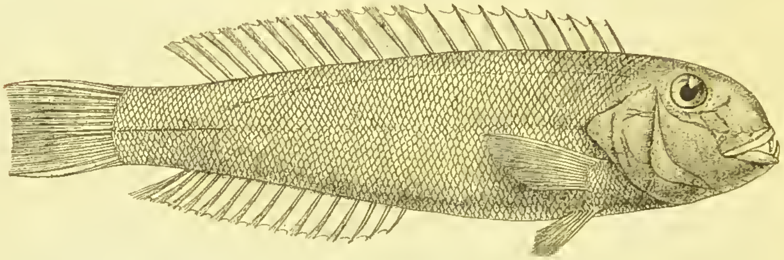

Fig. 145.—*Cymolutes prætextatus.*

Variety—"pale olive; head immaculate; body covered with narrow brown lines, angularly bent, the angle pointing backwards. Sometimes a round black spot below lateral line. Dorsal pale violet; specimens without a lateral blotch have a deep black margin to spinous portion. Anal orange or rosy; caudal orange, with yellowish transverse lines; ventrals and pectorals transparent."

Hab. East coast of Africa, Ceylon, Mauritius, to the Malay Archipelago.

17. Genus **PSEUDODAX**, Bleeker.

Syn. *Odax*, sp., Cuv. & Val.

Branchiostegals six. Body oblong, compressed. Upper jaw with one, lower with two, pairs of broad incisors, having cutting

lateral edges; teeth in the pharyngeals confluent and pavement-like. Dorsal with nearly the same number of spines as rays; anal with more rays than the second dorsal. Scales of moderate size, extended over the cheeks and opercles; an enlarged row at base of caudal fin. Lateral line continuous.

1294. (1.) **Pseudodax moluccanus.** (Fig. 146.)

Odax moluccanus, *Cuv. & Val. H. N. Poiss.* xiv, p. 305, pl. 408, fig. 2 (head).

Pseudodax moluccanus, *Day, Fish. India*, p. 409, pl. lxxxix, fig. 1 (see synon.).

D. 11/12. P. 15. V. 1/5. A. 3/14. C. 14. L. l. 32–33. L. tr. 4/12.

Length of head $4\frac{1}{4}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Colour*—back brownish red, abdomen lighter; most of the body-scales with a dark central spot. Teeth green. Dorsal

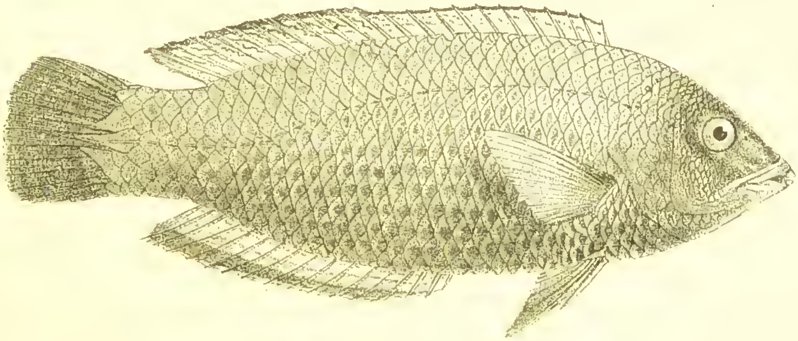

Fig. 146.—*Pseudodax moluccanus.*

and anal yellow in their basal portions, the former having black reticulated lines, a dark base, and a blue margin; anal from two to four dark undulating longitudinal bands and a dark blue-margined outer edge. Pectoral with a dark mark at its base. Caudal brown, with a blue posterior edge, some vertical darker bands, and large scales at its base of a light buff colour.

Hab. Nicobars, east coast of Africa, and Malay Archipelago.

18. Genus **SCARICHTHYS**, Bleeker.

Body oblong, compressed. Upper lip double in its whole extent. Teeth in one row, anteriorly soldered together, those in mandibles in a very oblique row; the inferior pharyngeal toothed plate broader than long. Dorsal with fewer spines, which are flexible, than rays. Scales large, a single row on the cheeks. Lateral line entire.

Geographical Distribution. Indian Ocean and tropical Pacific.

1295. (1.) **Scarichthys cæruleopunctatus.** (Fig. 147.)

Scarus (Calliodon) cæruleopunctatus, *Rüpp. N. W., Fische*, p. 24, t. vii, fig. 3.
Scarichthys cæruleopunctatus, *Day, Fish. India*, p. 410, pl. lxxxvii. fig. 5 (see synon.).

B. v. D. 9/10. P. 14. V. 1/5. A. 2–3/8–9. C. 13. L. l. 24.

Length of head $3\frac{3}{4}$ to 4, height of body 4 in the total length. *Eyes*—diameter 5 in length of head, 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Fins*—caudal rounded. *Colour*—olive-brown, body

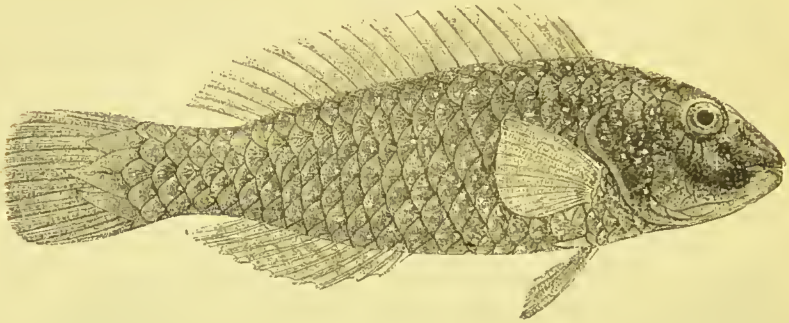

Fig. 147.—*Scarichthys cærulcopunctatus.*

and tail covered with blue black-edged spots; two or three rows of brown spots on dorsal, ventral, and anal fins.

Hab. Red Sea, east coast of Africa, seas of India, and Malay Archipelago.

19. Genus **CALLYODON** (Gronov.), Cuv. & Val.

Body oblong, rather compressed. Teeth in both jaws, anteriorly compressed and imbricate, in one row in the upper and two in the lower jaw, laterally soldered into one deep-cutting lamina; inferior pharyngeals, where the teeth (which are pavement-like) are present, broader than long. Anterior nostril with a barbel-like prolongation. Dorsal with fewer spines than rays; anal with two spines and fewer rays than the soft dorsal. Scales large; a single row on the cheeks. Lateral line strongly bent or interrupted below the posterior end of the dorsal fin.

Geographical Distribution. Intertropical seas generally.

1296. (1.) **Callyodon viridescens.** (Fig. 148.)

Scarus (Calliodon) viridescens, *Rüpp. N. W., Fische*, p. 23, t. vii, fig. 2.
Callyodon viridescens, *Day, Fish. India*, p. 410, pl. xc, fig. 2 (see synon.).

B. vi. D. 9/10. P. 13. A. 2/8. C. 13. L. l. 24.

Length of head $3\frac{3}{4}$, height of body 3 in the total length. *Eyes*—

diameter 5 in length of head, $1\frac{1}{2}$ diam. from end of snout. *Teeth*—outer upper tooth on either side recurved. *Scales*—cover lower third of dorsal fin. *Colour*—varies considerably; it may be brown, marbled and spotted darker; or green, with black dots on side, red streaks on snout, and oblique brown marks on dorsal and anal fins; or olive, becoming white below, and nearly every scale with

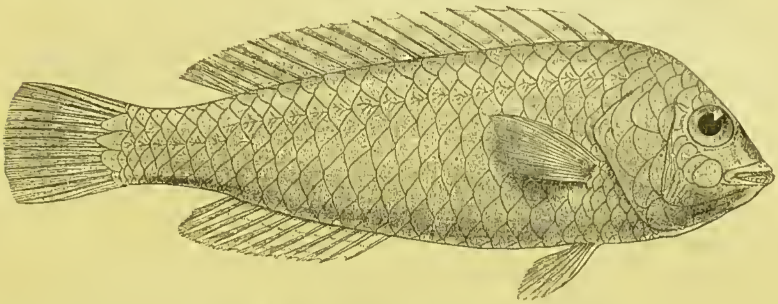

Fig. 148.—*Callyodon viridescens.*

a brick-red centre and white spots. Head and middle of body with scattered red spots having a dark centre. Two or three red lines on head, and a light lateral band from angle of opercle to root of tail. Reddish-yellow spots on dorsal and caudal fins, a black spot between first and second dorsal spines. Anal with a black edge and two red longitudinal bands that coalesce and enclose round white spots; ventrals white; pectorals yellow, with a black base.

Hab. Red Sea, east coast of Africa to the Andamans.

20. Genus **PSEUDOSCARUS**, Bleeker.

Syn. *Hemistoma,* Swainson.

Branchiostegals five. Body oblong, somewhat compressed. Upper jaw projecting beyond lower; the upper lip double in its whole extent. Anterior teeth soldered together, arranged in quincuncial order; teeth in inferior pharyngeal bones pavement-like, and the space they cover longer than broad. Dorsal with flexible spines which are fewer than the rays; anal with two spines, and fewer rays than the soft dorsal. Scales large, two or more rows on the cheeks; large ones at base of caudal fin. Lateral line continuous.

Geographical Distribution. Tropical Seas.

Synopsis of Indian Species.

A. Three rows of scales on the cheeks.
   Caudal lobed, lobes much produced in adults .... 1. *P. harid,* p. 424.
   Caudal truncated, angles slightly produced in adults.................... 2. *P. chrysopoma,* p. 424.
B. Two rows of scales on the cheeks.
   a. Two scales, below cheek rows, on lower limb of preopercle.

Scales of body with blue edges; vertical fins red, blue-edged . . . . 3. *P. ghobban*, p. 425.
Olivaceous, 3 silvery bands along abdomen . . . . 4. *P. æruginosus*, p. 425.
Green, each scale with a reddish base . . 5. *P. rivulatus*, p. 426.
Blue, scales with green centres, lower edge of body rose . . . . 6. *P. dussumieri*, p. 426.
b. No scales on preopercle.
Fins gaudily banded with blue, red, and green . . . . 7. *P. bataviensis*, p. 427.
Purplish brown. Caudal rounded . . . . 8. *P. erythrodon*, p. 427.
Pink, green, or brown. Caudal truncated . . . . 9. *P. sordidus*, p. 428.

1297. (1.) Pseudoscarus harid.

Scarus harid, *Forsk. Descr. Anim.* p. 30, no. 17.
Pseudoscarus harid, *Day, Fish. India*, p. 411 (see synon.).

D. 9/10. P. 15. A. 3/9. C. 13. L. l. 25. Vert. 11/13.

Length of head 4 to $4\frac{1}{2}$, of caudal 4 to 5, height of body 4 in the total length. *Eyes*—situated about middle of length of head, and about 4 diameters from end of snout, which is produced; upper lip broad. *Teeth*—a pointed one at the angle. *Fins*—anterior dorsal spines not so high as the succeeding ones; caudal lobes much produced in adults. *Scales*—three rows on cheeks, none on lower preopercular limb. *Colour*—olive-green, with two red streaks from forehead through eye; narrow red band including lips and passing towards base of pectoral; scales on body with a bluish basal spot and red margin. Dorsal and anal fins reddish edged with blue, and with several rows of blue or green spots. Upper rays of pectoral and outer rays of caudal blue, sometimes two vertical blue lines on caudal. There may also be blue spots on side above vent.

Hab. Red Sea, east coast of Africa, seas of India, to the Malay Archipelago.

1298. (2.) Pseudoscarus chrysopoma. (Fig. 149.)

Scarus chrysopomus, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Labr.* p. 53.
Pseudoscarus chrysopoma, *Day, Fish. India*, p. 412, pl. lxxxix, fig. 2 (see synon.).

D. 9/10. P. 14. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{2}{3}$ to $3\frac{3}{4}$, of caudal $8\frac{1}{4}$ to $8\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ to 6 in length of head, $2\frac{1}{3}$ diam. from end of snout, and 2 apart. *Teeth*—edges crenulated, a pointed tooth at the angle. *Fins*—dorsal spines subequal; caudal truncated, the angles slightly produced in adults. *Scales*—three rows of scales on cheeks, inferior row covering lower limb of preopercle, the middle row consisting of five scales. *Colour*—green. Upper lip with one, lower with two cross bands, passing into a subtriangular spot between the eye and the angle of

the mouth; three short lines radiate from eye. Scales with a reddish margin. Dorsal and anal rosy, a narrow band along their bases, and green margins; caudal green.

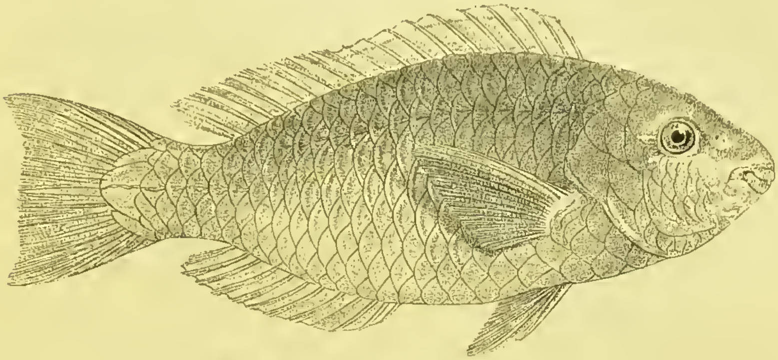

Fig. 149.—*Pseudoscarus chrysopoma.*

Hab. Seas of India and Malay Archipelago.

1299. (3.) Pseudoscarus ghobban.

Scarus ghobban, *Forsk. Descr. Anim.* p. 28, no. 13.
Pseudoscarus ghobbam, *Day, Fish. India,* p. 412 (see synon.).

D. 9/10. P. 15. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{3}{4}$ to 4, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{4}$ in length of head, 2 diam. from end of snout. *Teeth*—edges crenulated, none at angle in young, but said to be sometimes present in adult. *Fins*—dorsal spines subequal. Caudal truncated, outer rays somewhat produced in adult. *Scales*—two rows on cheeks, and two scales on lower limb of preopercle, the middle row consisting of five scales. *Colour*—head reddish; jaws whitish; a blue cross band on lips; a curved blue streak from angle of mouth to below eye; scales on body with blue edges; vertical fins red, with blue bases and margins; caudal sometimes with blue spots, and occasionally they are also present on the dorsal.

Hab. Red Sea, east coast of Africa, seas of India, to the Malay Archipelago.

1300. (4.) Pseudoscarus æruginosus.

Scarus æruginosus, *Cuv. & Val. H. N. Poiss.* xiv, p. 257.
Pseudoscarus æruginosus, *Day, Fish. India,* p. 412, pl. lxxxix, fig. 3 (see synon.).

D. 9/10. P. 14. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total

length. *Eyes*—diameter $4\frac{3}{4}$ to 5 in length of head, $1\frac{3}{4}$ to 2 diam. from end of snout, and 1 to $1\frac{1}{2}$ apart. *Teeth*—sometimes a small pointed one at angle of upper jaw. *Fins*—anterior dorsal spine rather shorter than the rest. Caudal truncated. *Scales*—two rows on cheeks, the second of which contains 5 or 6 scales, 2 more scales on lower preopercular limb. *Colour*—olivaceous, three longitudinal silvery bands along abdomen below pectoral.

Hab. Madras, common at the Andamans, Malay Archipelago and beyond.

1301. (5.) Pseudoscarus rivulatus.

Scarus rivulatus, *Cuv. & Val. H. N. Poiss.* xiv, p. 223.
Pseudoscarus rivulatus, *Day, Fish. India,* p. 413, pl. lxxxvii, fig. 6 (see synon.).

Sahnee moia, Tel.

D. 9/10. P. 14–15. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{3}{4}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 6 in length of head, 2 diam. from end of snout and also apart. *Teeth*—each jaw with 2 small ones at the corner. *Fins*—anterior dorsal spines rather shorter than posterior; caudal rather truncated. *Scales*—two rows on cheeks, and two scales on lower limb of preopercle, lower row on cheek consisting of 6 scales. *Colour*—green, each scale with a reddish base. Snout and cheeks reddish, with numerous undulating green lines. A narrow green band along base and edge of dorsal, with an intermediate row of spots. Anal green, lighter towards its margin, which is edged with dark green; caudal with green spots. The variety *russellii* is sea-green; each scale, except those on the chest, having a semilunar reddish base about half its width; the scales between bases of ventral and anal fins reddish; head rosy; a few short blue lines radiate from the lower edge of the orbit. Dorsal fin reddish, edged with light blue, a row of green spots along its middle and another at its base; caudal reddish, with 4 or 5 vertical bluish-green bands; anal similar to dorsal; pectoral and ventral reddish, the outer ray blue.

Hab. East coast of Africa, seas of India, Malay Archipelago and beyond.

1302. (6.) Pseudoscarus dussumieri.

? Scarus dussumieri, *Cuv. & Val. H. N. Poiss.* xiv, p. 252.
Peudoscarus dussumieri, *Day, Fish. India, Suppl.* p. 804 (see synon.).

D. 9/10. P. 15. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{3}{5}$, of caudal fin $6\frac{1}{2}$ in the total length. *Eyes*—diameter $6\frac{1}{2}$ in length of head, and 3 diam. from end of snout. *Teeth*—small ones at corner of either jaw. *Fins*—dorsal spines slightly increasing in length posteriorly and not so high as the

rays; caudal emarginate except in the young. *Scales*—two rows on cheeks and two scales on preopercular limb. *Colour*—cærulean blue, lower edge of body pale rose; the centre of every scale on blue portion gall-stone green, as also upper portion of head. Cærulean-blue bands and marks round the orbit. A blue band across upper lip, and another a short distance behind lower lip. Dorsal and anal fins orange, having a blue basal and a second outer band. Caudal of a similar colour, with its outer rays blue, and three broken vertical blue bands on its outer half. Pectoral rays as follows: the upper blue, the succeeding four orange, the remainder hyaline. Ventral outer ray blue, the rest hyaline, with the outer halves of the second and third rays orange gall-stone.

Hab. Red Sea, Persian Gulf, Arracan to the Malay Archipelago.

1303. (7.) Pseudoscarus bataviensis.

Scarus bataviensis, *Bleeker*, *Batavia Nat. Tijdsch.* xiii, p. 342.
Pseudoscarus bataviensis, *Bleeker*, *Atl. Ich.* i, p. 48, t. xii, fig. 3; *Day*, *Fish. India*, *Suppl.* p. 803 (see synon.).

D. 9/10. P. 14. A. 3/5. C. 13. L. l. 25.

Length of head 4, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 6 in length of head, $2\frac{1}{2}$ diam. from end of snout. *Teeth*—two small ones at the corner of either jaw. *Fins*—the dorsal spines of about the same length. Caudal nearly square in young, outer rays produced in old examples. *Scales*—two rows on cheeks, none on lower limb of preopercle. *Colour*—head above Indian red, extending to snout and throat, becoming gradually more diluted over the belly; golden green on cheeks and opercles. Eye surrounded by emerald-green, passing downwards in stripes to upper lip and chin. Body olive-green, becoming paler below. Dorsal fin banded as follows from summit to base—cobalt, deep vinous red, emerald-green, vinous red, and cobalt. Pectoral pale orange. Ventral rosy with its outer ray blue; anal banded as follows from outer edge to base—cobalt, rose, cobalt, red, and cobalt. Caudal venetian red, its upper and lower edges and three vertical bands cobalt. Every scale red at its base.

Hab. Arracan to the Malay Archipelago.

1304. (8.) Pseudoscarus erythrodon.

Scarus erythrodon, *Cuv. & Val. H. N. Poiss.* xiv, p. 255.
Pseudoscarus erythrodon, *Day*, *Fish. India*, p. 413 (see synon.).

D. 9/10. P. 15. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $5\frac{1}{2}$ in length of head, $1\frac{1}{3}$ to 2 diam. from end of snout, and $1\frac{1}{4}$ apart. *Teeth*—in the adult a conical tooth at the angle. *Fins*—dorsal spines subequal. Caudal rounded. *Scales*—two rows on cheeks, the lower not extended over lower limb of

preopercle. *Colour*—purplish brown, the edges of each scale being darker than the centre, the large scales covering first $\frac{2}{3}$ of caudal fin dull yellowish, a violet tint in thoracic region, where the centres of some scales are light. Snout greenish yellow. Vertical fins brown, the dorsal with a narrow black outer margin. Pectoral transparent.

Hab. East coast of Africa, Andamans to the Malay Archipelago. A specimen 2·7 inches long was taken at Port Blair.

1305. (9.) Pseudoscarus sordidus.

Scarus sordidus, *Forsk. Descr. Anim.* p. 30, no. 18.
Pseudoscarus sordidus, *Day, Fish. India,* p. 413 (see synon.).

D. 9/10. P. 15. V. 1/5. A. 3/9. C. 13. L. l. 25.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—diameter 6 to 8 in length of head, $2\frac{1}{2}$ to 3 diam. from end of snout, and 2 apart. Jaws strong. Lips very narrow. *Teeth*—the upper jaw with a pointed tooth at the angle. *Fins*—dorsal spines subequal; caudal truncated or slightly emarginate, and with its outer rays a little produced in adults. *Scales*—only 2 rows on cheeks, none on the lower limb of preopercle. *Colour*—in different specimens differs widely, being pink, green, or brown, and variously marked. Some have green lips and horizontal red marks across the cheeks, and the dorsal and anal fins may be with or without a median horizontal band or row of spots.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago.

Family XLIV. CHROMIDES.

Pseudobranchiæ absent. Gills four. Small teeth in jaws, none on palate; inferior pharyngeal bones triangular, with a median longitudinal suture. Dorsal fin single, the spinous portion usually of greater extent than the soft; anal with three or more spines, its soft portion similar to that of the dorsal. Ventrals thoracic, 1/5. Air-bladder present. Pyloric appendages, when present, few.

Geographical Distribution. Fresh waters of Africa and America; one genus in India.

1. Genus ETROPLUS, Cuv. & Val.

Syn. *Pseudetroplus,* Bleeker.

Branchiostegals six. Body elevated and compressed. Eyes

lateral. Cleft of mouth small. Teeth in two rows (or even three) in the jaws, compressed and lobate at their summits. Dorsal and anal spines more numerous than the rays. Scales very slightly ctenoid, of moderate size, and extended on to the bases of the soft dorsal and anal fins. Lateral line interrupted or abruptly ceasing. Air-bladder present, large and simple. Pyloric appendages absent.

Geographical Distribution. Peninsula of India as far north as Orissa, and Ceylon.

Synopsis of Indian Species.

D. 21–22/8, A. 14–16/6-7. Transverse bands .	1. *E. canarensis*, p. 429.
D. 17–20/8–10, A. 12–15/8–9. From one to three dark blotches along the sides............	2. *E. maculatus*, p. 429.
D. 18–19/14–15, A. 12–13/12–11. Transverse bands..................................	3. *E. suratensis*, p. 430.

1306. (1.) Etroplus canarensis.

Etroplus canarensis, *Day, Fish. India*, p. 414, pl. lxxxix, fig. 5.

D. 21–22/8. A. 14–16/6–7. C. 16. L. l. 30–31. L. tr. $5\frac{1}{2}$/16.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{3}$ in length of head, 1 diam. from end of snout and also apart. *Fins*—dorsal spines increasing in length to fifth, behind which they continue about equal. Soft dorsal and anal pointed; caudal emarginate. *Lateral line*—after about 15 to 25 scales either ceases or only continues as small open holes. *Colour*—yellowish buff, with about 8 vertical, blackish, slate-coloured bands, each scale darkest at its base, and some having a light central yellow spot. Dorsal and caudal dirty greenish; pectoral yellow, with a black base; ventral and anal black.

Hab. South Canara; attaining at least $4\frac{1}{2}$ inches in length.

1307. (2.) Etroplus maculatus. (Fig. 150.)

Chætodon maculatus, *Bloch, Ich.* t. 427, fig. 2.
Etroplus maculatus, *Day, Fish. India*, p. 415, pl. lxxxix, fig. 4 (see synon.).

Pullattay, Mal.; *Rallia*, Singhalese (Boake); *Boorakas, Chella kassu*, and *Shellel*, Tam.

D. 17–20/8–10. A. 12–15/8–9. L. l. 35. L. tr. 6/19. Vert. 15/13.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, rather above 1 diam. from end of snout, and 1 apart. *Teeth*—trilobate, but not quite touching one another. *Fins*—caudal lunate. *Colour*—yellowish, back greenish; about 17 horizontal lines of deep golden spots; occasionally there are a few along the dorsal fin, the back, and the abdomen, also on

the anal. Between the dorsal spines and rays are more spots, some brown, others yellow. Along the lateral line are three black finger-marks, the middle one the largest and darkest; ventral and

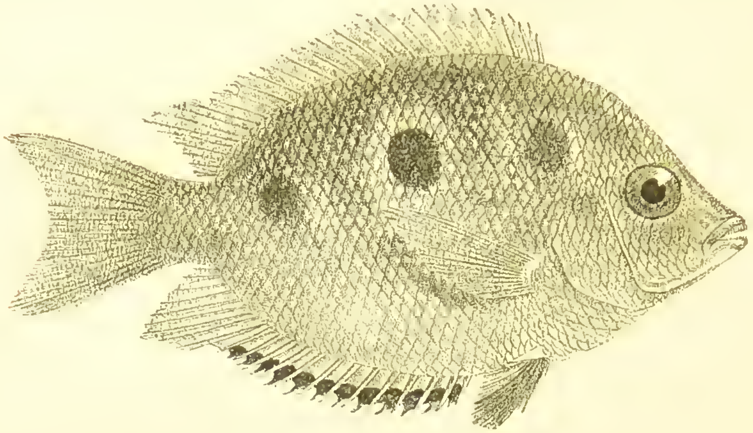

Fig. 150.—*Etroplus maculatus.*

anal fins stained with deep black. In specimens procured between January and May there is occasionally a reddish tinge at the extremity of the caudal fin, and a leaden or violet hue over the body, whilst the number of golden spots seems to have decreased.

E. maculatus rarely, if ever, exceeds three inches in length. Jerdon observes, "The eggs are not very numerous and are deposited in the mud at the bottom of the stream, and when hatched both parents guard their young for many days, vigorously attacking any large fish that pass near them." This species does not live long after its removal from water. In an aquarium it is exceedingly pugnacious, turning at times almost black with passion, and vigorously biting the nearest fish.

Hab. Fresh waters along the coasts of Madras, and from South Canara along Malabar, also found in Ceylon. This fish is captured at least 60 or 80 miles inland.

1308. (3.) Etroplus suratensis.

Chætodon suratensis, *Bloch, Ich.* t. 217.
Etroplus suratensis, *Day, Fish. India,* p. 415, pl. lxxxix, fig. 6 (see synon.).

Karssar and *Pillinchan,* Tam.; *Pitul-kas,* Hind.; *Cashi-mara,* Telinga (*Jerdon*); *Cundahla,* Ooriah; *Corallia,* Singhalese (*Boake*).

D. 18–19/14–15. P. 17. A. 12–13/12–11. C. 16. L. l. 35–40. L. tr. $5\frac{1}{2}$/17.

Length of head 4, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter from 3 to 4 in length of head, nearly 2 diam. apart. *Teeth*—in a single row in each jaw, compressed; posterior to them

in both jaws are one or two rows very much smaller, of the same description, and separated by a short interspace from outer row. *Fins*—caudal slightly emarginate. *Lateral line*—extending from 16 to 18 scales, or continued for about six scales further in the form of a small round hole in each scale. *Colour*—of a light green, with eight transverse bands, the first over the occiput, the last across the base of the caudal, the other six intermediate. Most of the scales above lateral line have a central white pearly spot; some irregular black spots over the abdomen. Dorsal, caudal, ventral, and anal of a dark leaden colour; the pectoral yellowish, with a jet-black base. Specimens from salt water are of a deep purple colour, the bands almost black, and the white spots consequently more distinct. During the monsoon the colours of this fish are most beautiful. Very young fish have a large black ocellus, surrounded by a white margin, extending from fourth to tenth soft rays of dorsal fin.

Hab. Very common in the pieces of fresh and brackish water along the coast of Malabar and on that of Coromandel as high as Orissa; also inland as high as the Wynaad on the western coast; likewise in Ceylon. This species is excellent eating, especially when large, and grows to upwards of a foot in length. It takes a bait freely.

Order III. ANACANTHINI.

All the rays of the vertical and ventral fins articulated, the latter, when present, jugular or thoracic. Air-bladder, if present, not having a pneumatic duct.

The order of spineless fishes, or *Anacanthini*, has been divided into two suborders :—

A. The two sides of the head and body symmetrical........ ANACANTHINI GADOIDEI.
B. The two sides unsymmetrical. ANACANTHINI PLEURONECTOIDEI.

Suborder A. *ANACANTHINI GADOIDEI.*

This suborder, to which cod, whiting, sand-eels, and other well-known fishes of temperate seas belong, is poorly represented in the seas around India.

Synopsis of Indian Families.

I. Ventrals generally with several rays. Caudal free, or if united to vertical fins, the first dorsal in two portions. **Gadidæ.**

II. Ventral when present rudimentary. No separate portion of dorsal fin; caudal usually united to vertical fins .. **Ophidiidæ.**

Family I. GADIDÆ.

Gadoidei, pt., Cuv.

Pseudobranchiæ, when present, glandular and rudimentary. Body more or less elongate. Gill-openings wide; gill-membranes, as a rule, not attached to the isthmus. From one to three dorsal fins, occupying nearly the entire length of the back, the rays of the last well developed; one or two anal fins; caudal usually free. The dorsal with a separate anterior portion. Ventrals jugular, consisting of several rays. Scales cycloid, of moderate or small size. Air-bladder and pyloric appendages usually present.

Geographical Distribution. The codfishes and their allies composing this family are mostly confined to the sea, and, as a rule, to the Arctic and temperate regions. The aberrant form *Bregmaceros* appears to be their sole representative in the Indian seas and it has a very wide range.

Genus 1. BREGMACEROS, Thompson.

Syn. *Calloptilum*, Richardson; *Asthenurus*, Tickell.

Branchiostegals seven; pseudobranchiæ absent. Body fusiform, posteriorly compressed. Mouth anterior and oblique. Teeth in jaws minute and movable, also on vomer, none on palate. Two dorsal fins, the anterior consisting of an elongate ray arising from the occiput; the second and the anal having each a median dwarfed portion almost forming a distinct fin. Ventrals consisting of five or six rays, the outer elongate. Air-bladder present. Pyloric appendages few.

Geographical Distribution. Coasts and estuaries of India, China, the Philippines, and New Zealand.

1309. (1.) Bregmaceros macclellandi. (Fig. 151.)

Bregmaceros macclellandi, *Thompson, Charlesworth's Mag. Nat. Hist.* 1840, iv, p. 184; *Day, Fish. India*, p. 418 (see synon.).
Bregmaceros atripinnis, *Tickell, J. A. S. B.* xxxiv, pt. 2, p. 32, pl. i; *Day, Fish. India*, p. 418, pl. xci, fig. 1 (see synon.).
Misalu magu, Tel.

D.1 | (16) 20+(x) xv+(15) 22. V.6. A. 22+x+(15) 26. L.tr. 18.

Length of head $6\frac{1}{3}$ to $6\frac{1}{2}$, height of body 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diam. from end of snout and also apart. *Fins*—the first dorsal ray reaches backwards to opposite posterior extremity of pectoral. First portion of the second dorsal higher than body, intermediate rays very low. Anterior portion of anal not quite so high as that of dorsal.

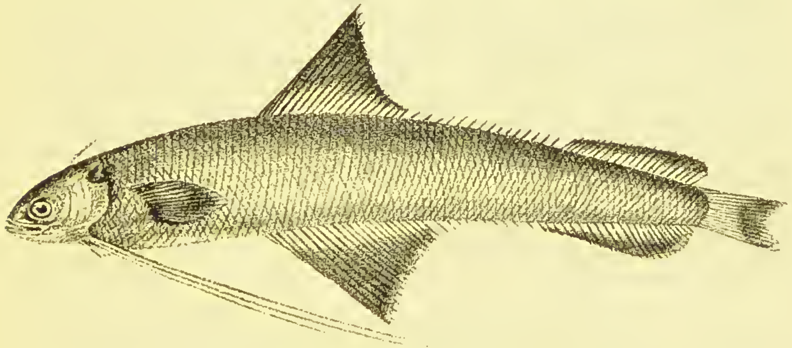

Fig. 151.—*Bregmaceros mcclellandi.*

Lateral line—absent. Cæcal appendages two, large. *Colour*—rich brown, lighter on abdomen. Dorsal, pectoral, anal, and caudal fins black; ventrals dirty white. The younger the specimen the less dark it is, in the very young there is no black on the fins.

Hab. Bombay and other coasts of India, Burma, the Andamans, and China to New Zealand; attaining at least 5 inches in length.

Family II. OPHIDIIDÆ.

Pseudobranchiæ present or absent. Body elongate. Gill-openings wide; the gill-membranes not attached to the isthmus. Sometimes canine teeth in the jaws. Vertical fins usually confluent, without any distinct anterior dorsal or anal. The dorsal occupies nearly the whole length of the back. Pectorals sometimes absent; ventrals when present rudimentary and jugular (except in *Brotulophis*). Vent sometimes at the throat. Air-bladder usually present. Pyloric appendages, when present, few in number.

Geographical Distribution. Seas and estuaries of nearly all parts of the globe.

Synopsis of Indian Genera.

Ventrals present; vertical fins united; barbels present. 1. BROTULA.
Ventrals absent; vertical fins united; vent near the head; no barbels .... 2. FIERASFER.
No ventral fins; caudal distinct from dorsal and anal; no barbels .... 3. AMMODYTES.

1. Genus BROTULA, Cuvier.

Branchiostegals eight. Body elongate, compressed. Barbels present. Villiform teeth on jaws, vomer, and palatines. Vertical fins confluent; ventrals reduced to a single filament, sometimes bifurcated; the fin is attached to the humeral arch. Scales present, minute. Air-bladder large, either rounded posteriorly or with two horns. A single pyloric appendage.

Geographical Distribution. Tropical Atlantic and Indian Ocean.

Synopsis of Indian Species.

Light dull greenish, with a few reddish-brown spots .... 1. *B. maculata*, p. 434.
Lilac, with black bands on head and back.. 2. *B. jerdoni*, p. 435.
Brown, outer border of vertical fins black with a red edge .... 3. *B. multibarbata*, p. 435.

1310. (1.) Brotula maculata. (Fig. 152.)

Brotula maculata, *Day, P. Z. S.* 1868, p. 196; *Fish. India*, p. 419, pl. xci, fig. 2.

D. 115. V. 1. A. 107.

Length of head 6, height of body 6 in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ diam. from end of snout, $\frac{1}{3}$ apart. A strong spine at opercle; two smaller ones at angle of preopercle.

Barbels—two on snout and two on either side of upper jaw, three pairs on lower jaw, making in all six pairs. *Teeth*—in fine sharp rows, becoming single posteriorly; a small patch on the vomer,

Fig. 152.—*Brotula maculata.*

and a single row on the palate. *Fins*—not enveloped in skin; ventral reaches beyond base of pectoral. *Scales*—minute, covering body and head. *Air-bladder*—large, rounded posteriorly. *Colour*—light dirty greenish brown, with a few reddish-brown spots about the body, and a round blackish mark behind the eye. Muzzle and barbels of upper jaw blackish. Fins greyish, external portion deep black.

Hab. Madras.

1311. (2.) Brotula jerdoni.

Brotula jerdoni, *Day, Fish. India, Suppl.* 1888, p. 804.

D. 126. V. 1. A. 95.

Length of head 6, height of body $5\frac{3}{4}$ in the total length. *Eyes*—(from the figure) diameter $3\frac{1}{2}$ in length of head, and $\frac{3}{4}$ diam. from end of snout. *Colour*—lilac along back, white beneath; a black band from eye to angle of subopercle, a second from above eye to base of pectoral, which fin it crosses obliquely, a third black band commences on the occiput, but soon divides into two, the upper branch going along base of dorsal fin, and the lower passing a short distance downwards and then running parallel to the first. *Fins*—yellowish, three large round black spots edged with white along upper margin of dorsal, which has a dark border, and externally edged with black.

Hab. An example 5·4 inches long, captured at Madras in August; a coloured figure of this is among Jerdon's and Elliot's illustrations.

1312. (3.) Brotula multibarbata.

? Brotula multibarbata, *Schlegel, Faun. Japon., Poiss.* p. 251, pl. cxi, fig. 2; *Day, Fish. India, Suppl.* 1888, p. 804 (see synon.).

D. C. & A. 165 (186). V. 2.

Length of head $5\frac{1}{2}$, height of body 5 (4 to $4\frac{1}{2}$) in the total length. Upper jaw the longer. Maxilla to below hind edge of eye. Opercle ending in a spine. *Barbels*—both jaws with three on either side. *Colour*—reddish or vinous burnt-umber, becoming

nearly white beneath. Vertical fins a little darker than the body, edged with black, and having a narrow red margin.

Hab. Colonel Tickell procured a specimen 4·9 inches long at Saddle Island off Kyoukhpyoo, Arracan, in 1862; the depth of its body is not so great as shown in Schlegel's figure. Jerdon procured one off Madras 8 inches long, the depth of body was only $\frac{1}{7}$ of total length.

2. Genus **FIERASFER**, Cuvier.

Syn. *Echiodon,* Thompson; *Diaphasia,* Lowe; *Oxybeles,* Richardson; *Porobronchus* (young), Kaup.

Branchiostegals seven; pseudobranchiæ absent. Body terminating in a long and tapering tail. Gills four; gill-membranes united beneath the throat, but not attached to the isthmus. The upper jaw overlapping the lower. No barbels. Cardiform teeth in the jaws, vomer, and palatines; canines sometimes present. Vertical fins continuous; ventrals absent. Vent under the throat. Scales, if present, minute. Air-bladder present. Pyloric appendages absent.

These fishes are "commensals" or "free messmates" and inhabit the digestive cavity of *Holothuria* or inside the arborescent respiratory processes that open at the posterior extremity of its body.

Geographical Distribution. Atlantic, Mediterranean, and Indo-Pacific.

1313. (1.) **Fierasfer homei.** (Fig. 153.)

Oxybeles homei, *Richardson, Voy. Erebus & Terror, Fish.* p. 74, pl. xliv, figs. 7–18.

Fierasfer homei, *Günther, Catal.* iv, p. 382; *Day, Fish. India, Suppl.* p. 805.

Length of head $7\frac{1}{2}$, height of body 12 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. *Teeth*—a rather widely-set, recurved row in upper jaw and a caniniform one near the middle, an outer row of small teeth; two rows in lower jaw, the outer the larger and somewhat curved, the largest teeth near symphysis; 2 or 3 rows on palatines; two large teeth placed one before the other on the vomer

Fig. 153.—*Fierasfer homei.*

and surrounded by smaller ones. *Scales*—absent. *Fins*—vertical enveloped in skin. *Colour*—yellowish red, a silvery band from the

upper edge of the opercles along first fourth of body; opercles silvery; end of tail with some black reticulations.

Hab. Madras (an example 4·8 inches long); found also in the Malay Archipelago and Australian seas.

3. Genus **AMMODYTES**, Linn.

Syn. *Bleekeria,* Günther.

Branchiostegals six to eight; pseudobranchiæ composed of lamellæ. Body low, elongate, and compressed. Gill-openings very wide, gill-membranes not united. Gills four. Barbels absent. Lower jaw usually prominent. Teeth, when present, minute. A single long dorsal fin, composed of feeble rays. Lateral line single. Air-bladder absent. Vent remote from the head.

Geographical Distribution. North Atlantic, Mediterranean, California; one species from India. This genus contains the "Sand-eels" or "Launces."

1314. (1.) **Ammodytes callolepis.** (Fig. 154.)

Bleekeria kallolepis, *Günther, Catal.* iv, p. 387.
Ammodytes kallolepis, *Day, Fish. India,* p. 420, pl. xci, fig. 3 (see synon.).

B. vi. D. 37–40. A. 14–15. L. l. 100. L. tr. 3/14.

Length of head about 5, height of body $10\frac{1}{4}$ in the total length. *Eyes*—2 diameters from end of snout. Lower jaw slightly the longer, the upper very protractile. *Fins*—dorsal does not extend to base of caudal. Anal commences below last two fifths of dorsal,

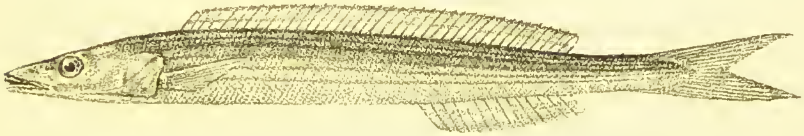

Fig. 154.—*Ammodytes callolepis.*

its rays rather higher. Caudal deeply forked. *Colour*—back and upper two thirds of body bluish, with about five yellowish horizontal bands, which are as wide as the ground-colour. Dorsal fin with a bluish base and yellow bands; anal with a bluish band along its middle; caudal stained grey externally.

Hab. Coromandel coast at Waltair and Madras.

Suborder B.

ANACANTHINI PLEURONECTOIDEI.

Head and body unsymmetrical.

A single family, containing the "Flat-fishes."

Family III. PLEURONECTIDÆ.

Heterosomata, Bonaparte.

Pseudobranchiæ well developed. Gills four. Body strongly compressed, flattened, with one of its sides coloured, the other destitute of colour, or having merely a few spots. Both eyes (except in the very young) placed on the superior or coloured surface, sometimes rudimentary. The jaws and dentition may be nearly equally developed on both sides, or more so on the blind than the coloured. A single long dorsal and anal fin. Scales present or absent. Lateral line on the coloured side single, double, or triple, curved or straight. Air-bladder absent.

Geographical Distribution. These fishes are found in most regions, residing at the bottom of the sea, some ascend rivers.

Synopsis of Indian Genera.

A. Jaws and dentition nearly equally developed on both sides.
- *a.* Dorsal fin commences on neck; eyes on right * or left side .... 1. PSETTODES.
- *b.* Dorsal fin commences before eyes; eyes always on left side.
  - *a'.* Lateral line nearly straight .... 2. CITHARICHTHYS.
  - *b'.* Lateral line with a well-marked anterior curve.
    - Eyes close together, no interorbital space .... 3. PSEUDORHOMBUS.
    - A concave interorbital space .... 4. PLATOPHRYS.

B. Cleft of mouth narrow; dentition most developed on blind or uncoloured side.
- *a.* Eyes on right side.
  - *a'.* Caudal fin distinct from dorsal and anal.
    - Pectorals more or less developed ...... 5. SOLEA.
    - Pectorals wanting .... 6. ACHIRUS.
  - *b'.* Caudal fin united to dorsal and anal .. 7. SYNAPTURA.

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* The terms right (*dextral*) and left (*sinistral*) in these fishes refer to the position of the coloured side. To ascertain this the fish is placed with its tail towards the observer, the dorsal fin upwards, the anal downwards.

b. Eyes on left side; no pectorals; vertical fins confluent.
Lips fringed with tentacles .... 8. PLAGUSIA.
Lips not fringed..................... 9. CYNOGLOSSUS.

1. Genus PSETTODES, Bennett.

Syn. *Sphagomorus,* Cope.

Branchiostegals seven. Cleft of mouth deep; the maxilla about half the length of the head. Gill-membranes scarcely united at the throat; gill-rakers replaced by groups of minute spines. Eyes and coloured surface on the right or left side. Jaws and dentition nearly equally developed on both sides. Two rows of curved, slender, sometimes barbed, distant teeth in either jaw, the anterior teeth of the inner mandibular row being received into a groove anterior to the vomer; teeth present on vomer and palate. Dorsal fin commencing on the nape. Most of the dorsal and anal rays branched. Scales small, ctenoid. Lateral line gradually descends to the straight portion.

Geographical Distribution. West coast of Africa, Red Sea, seas of India, the Malay Archipelago and beyond.

1315. (1.) Psettodes erumei. (Fig. 155.)

Pleuronectes erumei, *Bl. Schn. Syst. Ich.* p. 150.
Psettodes erumei, *Günther, Catal.* iv, p. 402; *Day, Fish. India,* p. 422, pl. xci, fig. 4 (see synon.).

Noree nalaka, Tel.; *Bhakas,* Maráthi.

D. 47–56. P. 16. V. 6. A. 35–41. C. 17. L. l. 70–75.

Length of head $4\frac{1}{6}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—

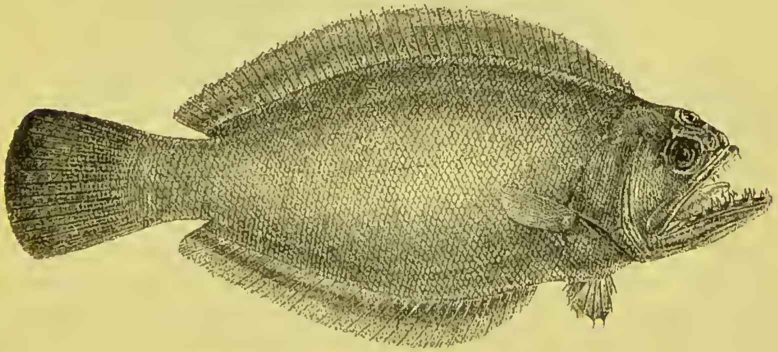

Fig. 155.—*Psettodes erumei.*

diameter 6 in length of head, usually separated by a mere ridge, $1\frac{1}{4}$ diam. from end of snout. Lower jaw much the longer. *Colour*—

brownish or purplish black, the vertical fins edged with white; a light band usually across free portion of tail. Cross bands have likewise been observed on the body.

Hab. That of the genus. This fish attains at least 16 inches in length.

2. Genus **CITHARICHTHYS**, Bleeker.

Syn. *Psettichthys*, Girard.

Gill-membranes broadly united at the throat. Cleft of mouth wide, and equally developed on both sides; the maxilla more than one third of the length of the head. Eyes on the left side and on the same level. Teeth in jaws in a single row, without canines; none on vomer or palatines. Dorsal fin commences on the snout, and is not confluent with the caudal; its rays simple. Pectorals present. Scales small, deciduous, and ctenoid, or cycloid. Lateral line straight.

Geographical Distribution. Madras, tropical parts of Atlantic.

1316. (1.) **Citharichthys aureus.** (Fig. 156.)

Citharichthys aureus, *Day, Fish. India*, p. 422, pl. xc, fig. 3.

B. vi. D. 82. P. 10. V. 6. A. 70. C. 15. L. l. 83.

Length of head $4\frac{1}{3}$, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter 6 in the length of head, 1 diam. from end of snout and also apart. Jaws of equal length anteriorly. *Fins*—anterior

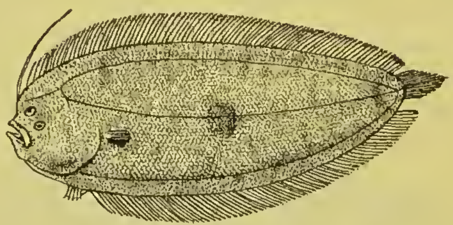

Fig. 156.—*Citharichthys aureus.*

dorsal spine elongate, commencing on snout, and rather longer than head; middle dorsal rays $\frac{2}{3}$ length of head. Caudal free and pointed. Two short ventrals not united to anal; fin-rays not scaled. *Lateral lines*—two on coloured side, straight, divided by about 13 rows of scales. *Colour*—orange, with two brown blotches on the lateral line and some cloudy markings on the body; vertical fins with dark edges.

Hab. Madras, where a single specimen was captured.

3. Genus **PSEUDORHOMBUS**, Bleeker.

Syn. *Chænopsetta*, Gill.

Cleft of mouth deep, the maxilla usually nearly half as long as the head. Gill-membranes united beneath the throat but not attached to the isthmus. Gill-rakers lanceolate. Eyes on the left side; interorbital space not concave. Jaws and dentition nearly equally developed on both sides; teeth in both jaws of unequal size and in a single row; vomer, palate, and tongue edentulous. Fin-rays simple; the dorsal fin commences on the snout. Scales of moderate size or rather small, and extended on to the dorsal and anal. Lateral line having a strong curve anteriorly.

Geographical Distribution. Atlantic, Pacific, and Indian Oceans, chiefly tropical.

Synopsis of Indian Species.

Five to ten pointed teeth in either jaw	1. *P. arsius*, p. 441.
Twenty to thirty teeth in either jaw........	2. *P. javanicus*, p. 442.
Teeth minute..........................	3. *P. triocellatus*, p. 442.

1317. (1.) **Pseudorhombus arsius.** (Fig. 157.)

Pleuronectes arsius, *Ham. Buch. Fish. Ganges*, pp. 128, 373.
Pseudorhombus arsius, *Günther, Catal.* p. 426; *Day, Fish. India*, p. 423, pl. xci, fig. 5 (see synon.).

B. vii. D. 71–79. P. 11 or 12. V. 6. A. 54–61. C. 17. L. l. 75–85.

Length of head $4\frac{1}{4}$ to $4\frac{1}{3}$, height of body $2\frac{1}{3}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, 1 diam. from end of

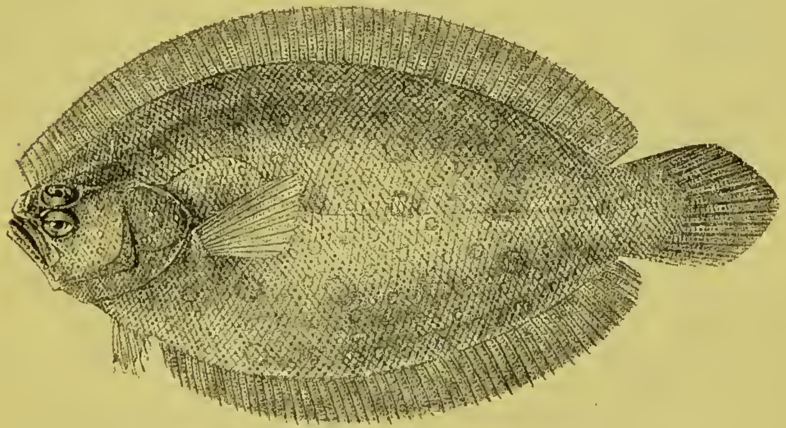

Fig. 157.—*Pseudorhombus arsius.*

snout, and closely approximating, being divided by a mere ridge. *Teeth*—from five to eight in the lower jaw on the left side, and six

to ten on the right. *Fins*—dorsal fin not continuous with caudal, longest rays in last third of dorsal; all except last three or four unbranched; last five anal rays branched, each fin-ray has a row of small scales. Pectoral two thirds length of head. Preanal spine, when present, but slightly apparent. *Scales*—ctenoid on the left, cycloid on right side; largest in posterior portion of body; some on the maxilla. *Lateral line*—smooth, its anterior curve equal to half its length. Dorsal branch goes to base of ninth, tenth, or eleventh ray. *Colour*—left side reddish brown, usually covered with variously sized rings, and often two dark ocelli on straight portion of lateral line.

Hab. East coast of Africa, seas and estuaries of India, and Australia; attaining at least a foot in length.

1318. (2.) **Pseudorhombus javanicus.**

Rhombus javanicus, *Bleeker, Batavia Nat. Tijdsch.* iv, p. 502.
Pseudorhombus javanicus, *Day, Fish. India,* p. 424, pl. xcii, fig. 2 (see synon.).

B. vi. D. 69. P. 10. V. 6. A. 52–53. C. 18. L. l. 70–75.

Length of head $4\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head, 1 diam. from end of snout; they are divided by a mere ridge. Anterior nostril with rather a tubular valve posteriorly. *Teeth*—small, sharp, conical, subequal in size, upwards of 30 on either side of upper jaw, and from 22 to 25 on either side of lower. *Fins*—anterior dorsal rays not higher than middle ones. A well-developed preanal spine. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral line*—with a strong anterior curve; nuchal branch goes to tenth dorsal ray. *Colour*—purplish brown, with three black spots on the lateral line, surrounded by a row of white dots, or else light blotches, each surrounded by a dark ring; the first of these spots is at commencement of straight portion of the lateral line. There are two or three other spots variously placed. The whole of the coloured side more or less covered with dots or dark rings, which are also continued on to the vertical fins.

Hab. Coromandel coast of India to the Malay Archipelago.

1319. (3.) **Pseudorhombus triocellatus.**

Pleuronectes triocellatus, *Bl. Schn. Syst. Ich.* p. 145.
Pseudorhombus triocellatus, *Day, Fish. India,* p. 424, pl. xcii, fig. 1 (see synon.).

Nooree-nalaka, Tel.; *Patné sootong,* Tam. (Jerdon).

B. vi. D. 66–69. V. 5. A. 49–51. L. l. 65–70.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 2 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and a mere ridge dividing the two. Posterior nostril patent, anterior more tubular, and with a short barbel-like prolongation.

Teeth—minute. *Fins*—anterior dorsal rays elevated, a rather strong preanal spine. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral line*—height of curve equals half its length. *Colour*—rich brown, with three large heart-shaped purplish ocelli triangularly disposed, the two anterior on a transverse line slightly before middle of fish, the third on lateral line midway between them and base of caudal. Vertical fins dusky yellow, covered with irregularly shaped dark blotches; pectoral yellowish, with some fine black spots.

Hab. Madras to the Malay Archipelago; attaining 6 or 8 inches in length.

4. Genus **PLATOPHRYS**, Swainson.

Syn. *Bothus*, Bp.; *Rhomboidichthys*, Bleeker.

Branchiostegals six. Cleft of mouth moderate or of small extent. Eyes on the left side separated by a concave interorbital space of varying extent. Jaws and dentition nearly equally developed on both sides; teeth minute, of equal size and in a single or double row. Vomerine and palatine teeth, as a rule, absent. The dorsal fin commences on the snout, its rays and those of the anal simple. Scales ctenoid, and extended on to the dorsal and anal rays. Lateral line having a strong curve anteriorly.

Geographical Distribution. Tropical seas, also Japan and the Mediterranean.

1320. (1.) **Platophrys pantherina.** (Fig. 158.)

Rhombus pantherinus, *Rüpp. Atl.* p. 121, t. 31, fig. 1.
Platophrys pantherinus, *Day, Fish. India*, p. 425, pl. xcii, figs. 3 & 4 (see synon.).

Fig. 158.—*Platophrys pantherina.*

D. 85–91. P. 10. V. 6. A. 65–70. C. 18. L. l. 75–85.

Length of head $4\frac{1}{4}$, height of body $2\frac{1}{6}$ in the total length. *Eyes*—

diameter $3\frac{3}{4}$ to 4 in length of head, $\frac{3}{4}$ to 1 diam. from end of snout, and 1 apart; one half of the lower eye anterior to the upper. *Teeth*—in two rows in maxilla. *Colour*—purplish brown on coloured side, with three dark spots along middle of body, others variously scattered, also some rings of a dark colour; vertical fins with brown spots and white dots.

Hab. Red Sea, east coast of Africa, Andamans, Malay Archipelago and beyond.

5. Genus **SOLEA**, Klein.

Cleft of mouth narrow, twisted round to the left side. Eyes on the right side, the upper partially or entirely in advance of the lower. Dentition most developed on the blind side, where the teeth in the jaws are in villiform rows, none on vomer or palate. The dorsal fin commences on the snout, and is not confluent with the caudal; one or both pectorals present. Scales small, ctenoid. Lateral line straight.

Geographical Distribution. All tropical and temperate seas.

Synopsis of Indian Species.

A. Both pectorals present.
- Eyes close together, anterior nostril tubular, longer than diam. of orbit .... 1. *S. heterorhina*, p. 444.
- Eyes $\frac{1}{2}$ diam. apart; height of body $\frac{1}{3}$ total length .... 2. *S. elongata*, p. 445.
- Eyes $\frac{3}{4}$ diam. apart; height of body $\frac{4}{9}$ total length .... 3. *S. ovata*, p. 445.

B. Pectoral wanting on left (blind) side.... 4. *S. indica*, p. 446.

1321. (1.) Solea heterorhina. (Fig. 159.)

Solea heterorhinos, *Bleeker, Act. Soc. Indo-Neerl.* i, *Amboina*, p. 64.
Solea heterorhina, *Day, Fish. India*, p. 426, pl. xcii, fig. 5 (see synon.).

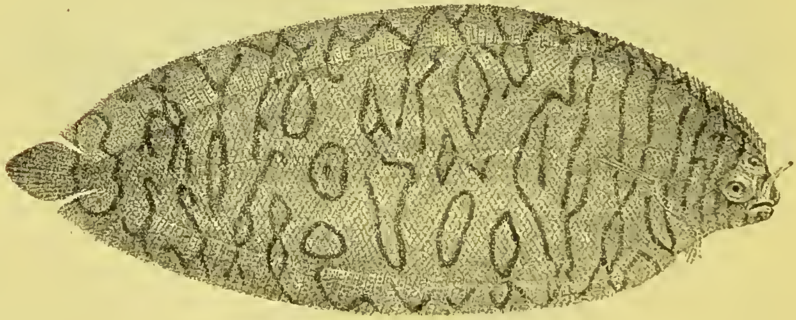

Fig. 159.—*Solea heterorhina.*

B. vi. D. 87–94. P. 8. V. 4. A. 78–82. C. 16. L. l. 105–110.

Length of head $6\frac{1}{2}$ to 7, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total

length. *Eyes*—close together, the upper slightly in advance of the lower; diameter $4\frac{1}{2}$ in length of head, and about $\frac{1}{2}$ diam. from end of snout. Two nostrils on coloured side, the posterior just before lower orbit, the anterior a little more in front, consisting, in the adult, of a long tube which laid backwards reaches hind edge of eyes; it is not so elongate in the young; a short tubular nostril on blind side. *Fins*—dorsal and anal rays unbranched. Pectoral on coloured side short, on blind side rudimentary. *Colour*—rich brownish olive, with irregular bands, blotches, and spots edged with black.

Hab. Andamans to the Malay Archipelago.

1322. (2.) Solea elongata.

Solea elongata, *Day, Fish. India,* p. 426, pl. xc, fig. 4.

B. vi. D. 70–73. P. 9. V. 4. A. 60–62. C. 18. L. l. 120.

Length of head $5\frac{1}{4}$, height of body 3 in the total length. *Eyes*—upper nearly on same transverse line as lower; diameter 5 in length of head, $\frac{1}{2}$ diam. apart, and 1 from end of snout. Numerous short tentacles about blind side of head, lips not fringed. Two nostrils—a small one in front of lower eye, and a tubular one anterior to it; that on blind side concealed. *Fins*—dorsal and anal rays unbranched. Pectoral on coloured side rather above $\frac{1}{2}$ length of head, and much longer than that on blind side. *Colour*—olive stone, irregularly banded, with black spots and blotches; fins also spotted. Pectoral with a black blotch in middle.

Hab. Madras, where two specimens were obtained.

1323. (3.) Solea ovata.

Solea ovata, *Richardson, Ich. China,* p. 279; *Day, Fish. India,* p. 426, pl. xciii, fig. 1 (see synon.).

Selle-patté, Tam.

B. vi. D. 60–66. P. 9. V. 5. A. 42–49. C. 12. L. l. 110.

Length of head 5 to $5\frac{1}{4}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—upper one half in advance of lower; diameter 5 in length of head, $\frac{3}{4}$ diam. apart, and the lower $1\frac{1}{4}$ diam. from end of snout. Numerous short tentacles about blind side of head, lips not fringed. A small open nostril just in front of lower eye, and a tubular one nearer snout; that of the blind side not dilated, concealed. *Fins*—dorsal and anal rays, except last few, unbranched. Pectoral on coloured side two thirds as long as head and half longer than that on blind side. *Colour*—olive-brown, with spots and blotches of black on the coloured side of body and vertical fins. Pectoral with a black blotch, sometimes occupying outer two thirds of fin.

Hab. Madras to China.

1324. (4.) Solea indica.

Solea indica, *Günther, Catal.* iv, p. 474; *Day, Fish. India*, p. 426.

B. vi. D. 55. V. 4. A. 44. C. 12. L. l. 75.

Length of head $4\frac{1}{4}$, height of body $2\frac{1}{8}$ in the total length. *Eyes*—small, the upper slightly in advance of the lower, and 1 diameter apart. Jaws of about equal length. No tentacles on head. *Fins*—most rays of vertical fins branched, the highest dorsal two thirds length of head; right ventral slightly longer than eye, and continuous with anal. Left pectoral absent. Caudal rounded. *Scales*—strongly ctenoid. *Colour*—brownish, the vertical fins darker.

Hab. Madras; one specimen (22 lines long).

6. Genus ACHIRUS, Lacépède.

Syn. *Pardachirus*, Günther.

Branchiostegals six. Gill-openings narrow, the membranes broadly united below the throat; gill-rakers rudimentary. Eyes on right side, the upper in advance of the lower. Mouth narrower on the left side. Teeth minute and only on the blind side. The dorsal fin commences on the snout and ends close to the root of the caudal, the two fins not confluent; each dorsal and anal ray scaly, and generally with a pore at the base of each. Two ventrals united to the anal. Pectorals absent. Scales small. Lateral line straight, on the blind side there are two, the upper, commencing at the snout, passes along the upper profile of the neck.

Geographical Distribution. Red Sea, seas of India, Nicobars and Malay Archipelago.

Synopsis of Indian Species.

L. l. 90–100. Greyish brown, with milk-white spots .... 1. *A. pavoninus*, p. 446.
L. l. 65. Brown with dark spots .... 2. *A. maculatus*, p. 447.

1325. (1.) Achirus pavoninus. (Fig. 160.)

Achirus pavoninus, *Lacép. H. N. Poiss.* iv, pp. 658, 661; *Day, Fish. India*, p. 427, pl. xciii, fig. 2 (see synon.).

D. 64–70. V. (r.) 4 (l.) 5. A. 50–56. C. 15. L. l. 90–100.

Length of head $5\frac{1}{4}$ to $5\frac{2}{3}$, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, anterior edge of lower eye $1\frac{1}{2}$ diameters from end of snout. Numerous rather long fringes along the edges of both upper and lower jaws, also on left side of head. *Fins*—an open pore at base of each dorsal and anal ray on left side. Anterior dorsal and anal rays branched. *Scales*—ctenoid on head and anterior portion of body. *Colour*—right

side greyish brown, covered with milk-white spots of various shapes and sizes, each having a black outer edge and some a central black dot.

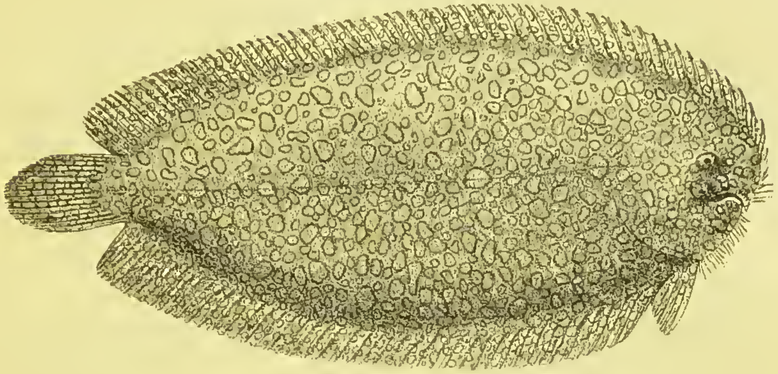

Fig. 160.—*Achirus pavoninus.*

Hab. Andamans to the Malay Archipelago and beyond.

1326. (2.) Achirus maculatus.

Pleuronectes maculatus, *Bl. Schn. Syst. Ich.* p. 157.
Achirus maculatus, *Day, Fish. India*, p. 427.

D. 56. V. 6. A. 43. C. 15. L. l. 65.

Length of head $4\frac{1}{3}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 9 in the length of head, and $\frac{2}{3}$ diam. apart. Lower lip fringed. *Teeth*—minute ones present on blind side. *Fins*—most dorsal rays appear to be branched, the highest in the posterior third of the body; a pore at the base of each dorsal and anal ray on the blind side. *Colour*—slaty brown on the right side, with numerous dark blotches, and some vertical black lines crossing the lateral line at a right angle. Blind side of body yellowish with scattered black blotches.

Hab. Tranquebar, whence Bloch received the specimen described (6·5 inches in length).

7. Genus SYNAPTURA, Cantor.

Syn. *Brachirus*, Swains.; *Achiroides*, Bleeker; *Æsopia*, *Euryglossa*, and *Eurypleura*, Kaup.

Branchiostegals six. Eyes on the right side, the upper in advance of the lower. Cleft of the mouth narrow, twisted round to the left side; the lips fimbriated or entire; minute teeth on the left side only; palate edentulous. Vertical fins confluent. Scales ctenoid (cycloid in *S. cornuta*), small. Lateral line straight.

Geographical Distribution. Shores of Indian Ocean: two species from Mediterranean.

Synopsis of Indian Species.

A. Both pectorals developed, the right longer.
  a. Grey, unspotted, vertical fins white-edged .... 1. *S. commersoniana*, p. 448.
  b. Brown with white spots, vertical fins white-edged .... 2. *S. albomaculata*, p. 448.
  c. Grey or brown with black bands or blotches.
    Scales on nape not enlarged .... 3. *S. orientalis*, p. 449.
    Scales on nape enlarged .... 4. *S. pan*, p. 449.
B. Left pectoral rudimentary.
  About 27 transverse bands. Nasal tube long .... 5. *S. multifasciata*, p. 450.
  About 13 transverse bands. First dorsal ray prolonged .... 6. *S. cornuta*, p. 450.
  About 10 transverse bands. No prolonged dorsal ray .... 7. *S. zebra*, p. 450.

1327. (1.) Synaptura commersoniana.

Pleuronectes commersonianus, *Lacép. H. N. Poiss.* iii, pl. 12, fig. 2 (not iv, p. 656).
Synaptura commersoniana, *Cantor, Catal.* p. 222; *Day, Fish. India*, p. 428, pl. xciv, fig. 1 (see synon.).

Erumi naak, Tam.; *Nga khwey sha*, Burmese; *Jerree-potoo*, Tel.

D. 70–81. P. 9. V. 4. A. 60–63. C. 12. L. l. 155–160.

Length of head $5\frac{1}{2}$ to $6\frac{1}{2}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—upper almost entirely in advance of lower; diameter $7\frac{1}{2}$ in length of head, nearly $\frac{1}{2}$ diam. apart, and $1\frac{1}{4}$ from end of snout. Two tubular nostrils in front of lower eye. *Colour*—leaden grey, vertical fins black with a broad white outer edge.

Hab. Seas of India to the Malay Archipelago; attaining at least 12 inches in length. Not esteemed as food in Madras or along the Malabar coast.

1328. (2.) Synaptura albomaculata. (Fig. 161.)

Synaptura albomaculata, *Kaup, Wiegm. Arch.* 1858, p. 96; *Day, Fish. India*, p. 429, pl. xciii, fig. 5 (see synon.).

D. 72–74. P. 7–8. V. 4. A. 56–59. C. 16. L. l. 110–120.

Length of head $5\frac{1}{2}$ to 6, height of body $3\frac{1}{3}$ to $3\frac{2}{3}$ in the total length. *Eyes*—of moderate size, the upper half in advance of the lower. Lips on coloured side fringed. Two tubular nostrils on coloured side; a short barbel between the two nostrils. *Fins*—pectoral

on coloured side $\frac{4}{11}$ length of head, very small on blind side. *Scales*—ctenoid on coloured, cycloid on blind side. *Colour*—body

Fig. 161.—*Synaptura albomaculata.*

brown on coloured side, with three to five rows of widely separated white dots. Fins slate-coloured, edged with white.

Hab. Seas of India; attaining at least 12 inches in length.

1329. (3.) Synaptura orientalis.

Pleuronectes orientalis, *Bl. Schn. Syst. Ich.* p. 157.

Synaptura orientalis, *Day, Fish. India*, p. 429, pl. xciii, fig. 4 (as *S. cinerascens*), & pl. xciv, fig. 2 (see synon.).

Sappatee, Mal.

D. 62–65. P. 7. V. 5. A. 47–50. C. 16. L. l. 70–85.

Length of head 5 to $5\frac{1}{6}$, height of body $2\frac{2}{3}$ to $2\frac{1}{6}$ in the total length. *Eyes*—the upper one slightly in advance of the lower; $\frac{2}{3}$ to 1 diameter apart. Nasal tube on coloured side, simple. *Fins*—right pectoral longer than left, and $\frac{3}{8}$ to $\frac{1}{3}$ length of head. Dorsal rays branched at their extremities. *Scales*—ctenoid on both sides. Lips on blind side and head with numerous short cutaneous filaments, some also on coloured side and generally black. *Colour*—bluish slate on right side, usually with short narrow black vertical bands crossing the lateral line; the body is likewise blotched darker sometimes as spots, in other instances in bands, occasionally some white marks. Vertical fins dark, outer half of pectoral black. The scales on the head and first third of this fish are usually smaller than those further back.

Hab. Sind, western coast of India, Andamans, China seas.

1330. (4.) Synaptura pan.

Pleuronectes pan, *Ham. Buch. Fish. Ganges*, pp. 130, 373, pl. 24, fig. 42.

Synaptura pan, *Day, Fish. India*, p. 429, pl. xciii, fig. 3 (see synon.).

D. 57–60. P. 7. V. 6. A. 43–45. C. 14. L. l. 80.

Length of head 5, height of body $2\frac{1}{2}$ in the total length. *Eyes*—upper slightly in advance of lower; diameter 6 in length of head, 2 diam. from end of snout, and scarcely 1 apart. Two nostrils,

the front one tubular; nostril on blind side concealed. Lower lip slightly fringed on coloured side. *Fins*—posterior dorsal and most of the anal rays branched. Right pectoral $\frac{5}{7}$ length of head, and much longer than left, which consists of six rays. *Scales*—strongly ctenoid on both sides; those from above eye to nape and in a wide band crossing nape much larger than those on remainder of body; vertical fins rather densely scaled. *Colour*—dull red or muddy brown or grey, with irregular vertical black blotches and bands; right pectoral black.

Hab. Estuaries and tidal rivers of Orissa, Ganges delta, Burma, and Malay Archipelago; attaining about 6 inches in length.

1331. (5.) Synaptura multifasciata

Æsopia multifasciata, *Kaup, Wiegm. Arch.* xxiv, 1858, p. 97.
Synaptura multifasciata, *Day, Fish. India*, p. 430 (see synon.).

D. 93. P. 7–10. A. 67. L. l. 110.

Length of head 7, height of body 3 in the total length. *Eyes*—placed close together. Nasal tube longer than diameter of eye. *Fins*—two longest pectoral rays exceed diameter of lower eye. *Colour*—head and body with twenty-seven narrow cross bands.

Hab. East Indies. This fish may be a reversed *Solea heterorhina*.

1332. (6.) Synaptura cornuta.

Æsopia cornuta, *Kaup, Wiegm. Arch.* xxiv, 1858, p. 98.
Synaptura cornuta, *Day, Fish. India*, p. 430, pl. xciv, fig. 4 (see synon.).

Jerree-potoo, Tel.; *Indi*, Maráthi.

D. 69–75. P. 17. V. 3–4. A. 61–62. C. 17. L. l. 90–100.

Length of head 6, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, scarcely 1 diam. from end of snout, and close together; upper eye scarcely, if at all, in advance of lower. A few short filaments along lower edge of mandible. A round nostril before lower eye, and in front of the round nostril a tubular one. *Fins*—right pectoral rather longer than left, but both very short. First dorsal ray thickened and prolonged, the next few rays lower than the succeeding ones. *Scales*—cycloid on both sides. *Colour*—twelve to thirteen transverse chestnut bands on a light ground-colour, the anterior bands on the snout; these markings are continued on to the vertical fins. Caudal dark, with white marks, dorsal with a white edge.

Hab. Coromandel coast; attaining at least 6 inches in length.

1333. (7.) Synaptura zebra.

Pleuronectes zebra, *Bl. Ich.* t. 187.
Synaptura zebra, *Day, Fish. India*, p. 430, pl. xciv, fig. 3 (see synon.).

Jerree-potoo, Tel.; *Varri amler*, Tam.

D. 65–74. P. 6. V. 5. A. 58–60. C. 16–18. L. l. 90–95.

Length of head 6, height of body 3 in the total length. *Eyes*—close together, anterior third of upper in advance of lower; diameter $4\frac{1}{2}$ in length of head, the lower about 1 diam. from end of snout. Two nostrils in front of lower eye, the anterior tubular. *Barbels*—in some, not all specimens, there is a barbel above either eye. *Fins*—pectorals attached to gill-covers, upper two rays on right side longer than others; left pectoral rudimentary. *Scales*—ctenoid. *Colour*—greyish brown, with ten reddish-brown transverse bands, commencing on the dorsal and continued on to the anal fin, where they become nearly black; pectoral on right side nearly black; caudal black, with some irregular white markings towards its edges.

Hab. Seas of India, including Ceylonese and ? Chinese seas; attaining at least 6 inches in length.

8. Genus **PLAGUSIA**, pt., Cuvier.

Syn. *Paraplagusia*, Bleeker.

Branchiostegals six. Gill-openings very narrow. Eyes on the left side. Anterior portion of snout prolonged and curving downwards and backwards in the form of a hook which covers the mandible. Mouth rather narrow and unsymmetrical; lips on the coloured side fringed. A single nostril on the left side before the angle of the lower eye, none in the interorbital space. Vertical fins confluent. Pectorals absent. Scales ctenoid, small. Lateral line, on the coloured side, double or triple.

Geographical Distribution. Indian Ocean and Red Sea.

Synopsis of Indian Species.

Two lateral lines on left side separated by 16 or 17 rows of scales .... 1. *P. marmorata*, p. 451.

Two lateral lines on left side separated by 13 or 14 rows of scales .... 2. *P. bilineata*, p. 452.

1334. (1.) Plagusia marmorata. (Fig. 162.)

Plagusia marmorata, *Bleeker, Batavia Nat. Tijdsch.* i, p. 411; *Day, Fish. India*, p. 431, pl. xcv, fig. 1 (see synon.).

Nah-lah-ku, Tamil.

D. 99–106. V. 4. A. 75–86. C. 10. L. l. 90–100.

Length of head $4\frac{1}{4}$ to $4\frac{1}{3}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—small, the upper in advance of the lower, in middle of length of head, nearly 1 diameter apart. Angle of mouth below the hind edge of the eye and nearer to hind edge of opercle than

to snout. A tubular nostril in front of lower eye; nostril developed on blind side. *Fins*—a single ventral. *Lateral lines*—two

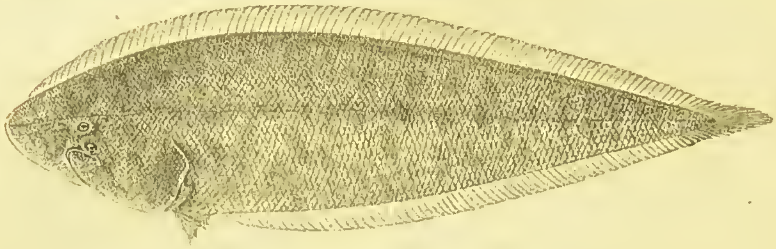

Fig. 162.—*Plagusia marmorata.*

on left side separated by 16 or 17 rows of scales, and one on right side. *Colour*—brownish, finely marbled darker.

Hab. East coast of Africa, seas of India to China.

1335. (2.) Plagusia bilineata.

Pleuronectes bilineatus, *Bloch, Ich.* t. 188.
Plagusia bilineata, *Day, Fish. India,* p. 431 (see synon.).

Jerree-potoo, Tel.; *Aralu,* Tamil; *Kookoor jib,* Chittagong; *Nga khwey sha,* Burmese.

D. 96–102. V. 4. A. 70–74. C. 8. L. l. 84–94.

Length of head $4\frac{1}{6}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—in middle of length of head; diameter 8 to 12 in length of head, 1 diam. apart, upper in advance of lower. Angle of mouth considerably nearer to gill-opening than to end of snout. A single tubular nostril on coloured side in front of lower eye and close to lip. A well-developed tubular nostril on blind side. *Fins*—a single ventral attached to anal. *Lateral lines*—two on coloured side separated by 13 or 14 rows of scales; a single lateral line on blind side. *Colour*—opercle tinged with bluish black; each scale on the body lightest in its centre; fins dull orange.

Hab. Red Sea, seas of India to the Malay Archipelago. This species attains at least 10 inches in length, and is good eating.

9. Genus CYNOGLOSSUS, Hamilton Buchanan.

Syn. *Cantoria, Arelia, Trulla, Icania,* Kaup.

Branchiostegals six. Gill-openings very narrow. Eyes on the left side. Anterior portion of snout prolonged, and curved downwards and backwards in the form of a hook. Mouth rather narrow and unsymmetrical. Lips not fringed. Two nostrils on coloured side in all Indian species, one patent between the orbits and the other tubular before the lower eye. Minute teeth on the right side only. Vertical fins confluent; pectorals absent. Lateral line on the coloured side double or triple.

Geographical Distribution. Tropical seas; some species are found in tidal rivers, and are said to enter fresh water.

Synopsis of Indian Species.

A. Three lateral lines on coloured side .. 1. *C. quinquelineatus*, p. 453.
B. Two lateral lines on coloured side.
  a. One lateral line on blind side.
    a'. Height (transverse diameter) 6–$6\frac{1}{2}$ in total length.
      Scales between lat. lines on left side, where widest apart, 13 .... 2. *C. lingua*, p. 454.
      Scales between lat. lines 8........ 3. *C. elongatus*, p. 454.
    b'. Height 5–$5\frac{1}{4}$ in total length.
      Ventral not united to anal........ 4. *C. oligolepis*, p. 455.
      Ventral united to anal .... 7. *C. arel*, p. 456.
    c'. Height more than $\frac{1}{5}$ of total length.
      a''. Scales between lateral lines, where widest apart, 7...... 5. *C. macrolepidotus*, p. 455.
      b''. Scales between lateral lines 10. 18. *C. brevirostris*, p. 459.
      c''. Scales between lateral lines 12–14.
        α. Left side uniformly coloured.
          Ventral united to anal ...... 12. *C. bengalensis*, p. 457.
          Ventral not united to anal .... 14. *C. lida*, p. 458.
        β. Left side mottled .... 15. *C. semifasciatus*, p. 458.
      d''. Scales between lateral lines 15–18.
        α. Eyes 1 diameter apart.
          Angle of mouth extends behind eye...................... 11. *C. brachyrhynchus*, p. 457.
          Angle of mouth below eye.... 16. *C. puncticeps*, p. 459.
        β. Eyes close together.
          Height (transverse diam.) $4\frac{1}{4}$ in total length............ 13. *C. hamiltonii*, p. 458.
          Height $3\frac{1}{4}$ to $3\frac{1}{3}$ in total length. 17. *C. brevis*, p. 459.
  b. Two lateral lines on blind side.
    a'. Ventral not united to anal, a black blotch on opercle............ 6. *C. sindensis*, p. 455.
    b'. Ventral united to anal.
      Scales between lateral lines on coloured side 18–19............ 8. *C. dispar*, p. 456.
      Scales between lateral lines 21 .... 9. *C. dubius*, p. 456.
      Scales between lateral lines 14–15.. 10. *C. quadrilineatus*, p. 457.

1336. (1.) Cynoglossus quinquelineatus.

Cynoglossus quinquelineatus, *Day, Fish. India*, p. 432, pl. xcviii, fig. 1.

D. 109. V. 4. A. 91. C. 13. L. l. 100.

Length of head $5\frac{1}{3}$, height of body 4 in the total length. *Eyes*—diameter $9\frac{1}{2}$ in length of head, about 4 from end of snout, and 1 apart; upper slightly in advance of lower. The maxilla extends rather behind the hind edge of the lower orbit, and is situated

rather nearer to the gill-opening than to the end of the snout. Nostril on blind side not concealed. *Fins*—a single ventral adherent to the anal. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral lines*—three on coloured side, the upper and middle separated where widest apart by 17 rows of scales, the middle and lower by 15. Two lateral lines on blind side. *Colour*—brownish, opercles black.

Hab. Madras. A single specimen 10 inches long.

1337. (2.) Cynoglossus lingua. (Fig. 163.)

Cynoglossus lingua, *Ham. Buch. Fish. Ganges*, pp. 32, 365; *Day, Fish. India*, p. 433, pl. xcvi, fig. 1 (see synon.)

Jerree-potoo, Tel; *Kot-aralu*, Tam.; *Nepati*, Maráthi.

D. 142–150. V. 4. A. 105–110. C. 8. L. l. 100–115.

Length of head $4\frac{3}{4}$ to 5 or even $5\frac{1}{2}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—about middle of head, diameter 12 to 14 in length of head, upper slightly in advance of lower, and about 1 diam. apart. Cleft of mouth extends a short distance behind posterior edge of eyes. *Scales*—very feebly ctenoid on coloured side;

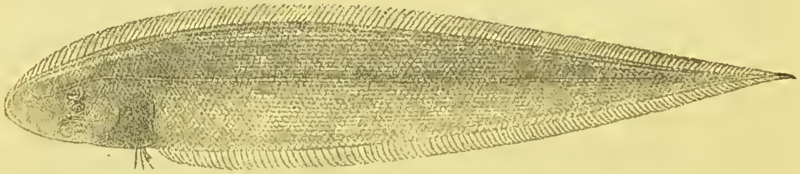

Fig. 163.—*Cynoglossus lingua.*

cycloid on uncoloured side. *Lateral lines*—two on coloured side, divided where furthest apart by 13 rows of scales; on uncoloured side the lateral line is very indistinct. *Colour*—reddish brown, sometimes with some cloudy markings, generally lineated; opercles nearly black.

Hab. Seas and estuaries of India; attaining at least 18 inches.

1338. (3.) Cynoglossus elongatus.

Cynoglossus elongatus, *Günther, Catal.* iv, p. 501; *Day, Fish. India*, p. 433, pl. xc, fig. 5 (see synon.).

D. 137–140. V. 4. A. 107–110. C. 10. L. l. 95–110.

Length of head $4\frac{3}{4}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—small, the upper in advance of the lower; diameter 11 in length of head, 4 diam. from end of snout, and close together. Angle of mouth extends behind eye, and nearer gill-opening than snout. *Fins*—a single ventral attached to anal. *Scales*—cycloid on both sides. *Lateral lines*—two on coloured side, divided where furthest apart by 8 rows of scales; one on blind side. *Colour*—reddish brown, opercle with a dark band; vertical fins with a black outer edge.

Hab. Madras and Pinang.

1339. (4.) Cynoglossus oligolepis.

Plagusia oligolepis, *Bleeker, Batavia Nat. Tijdsch.* vii, p. 445.
Cynoglossus oligolepis, *Day, Fish. India,* p. 433, pl. xcv, fig. 4 (see synon.).

D. 118-129. V. 4. A. 91-95. C. 12. L. l. 65-75.

Length of head $4\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—small, situated just before middle of head, half of upper in advance of lower, $\frac{3}{4}$ of a diam. between the two. Angle of mouth $\frac{1}{4}$ of a diam. of the orbit behind the lower eye. *Fins*—only left ventral present, and it is not connected with the anal. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral lines*—two on left side, separated where furthest apart by 8 or 9 rows of scales; one on the blind side. *Colour*—rich brown on the coloured side, without any markings.

Hab. Seas of India to the Malay Archipelago.

1340. (5.) Cynoglossus macrolepidotus.

Plagusia macrolepidota, *Bleeker, Batav. Genootsch. Verhand.* xxiv *Pleuron.* p. 25.
Cynoglossus macrolepidotus, *Day, Fish. India,* p. 434, pl. xcvi, fig. 3 (see synon.).

D. 116-118. V. 4. A. 86-90. C. 11. L. l. 50-55.

Length of head $4\frac{1}{3}$ to $4\frac{2}{3}$, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—small; diameter 14 to 15 in length of head, 4 to $4\frac{1}{2}$ diam. from end of snout, and 1 apart. Angle of mouth in the middle of the length of head. Nostril not exactly between eyes, but a little in front. *Fins*—rays unbranched. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral lines*—two on right side separated by 6 or 7 rows of scales where widest apart, one on blind side. *Colour*—brownish, with an ill-defined bluish band along bases of dorsal and anal fins; a bluish blotch on opercles.

Hab. Seas and coasts of India to the Malay Archipelago.

1341. (6.) Cynoglossus sindensis.

Cynoglossus sindensis, *Day, Fish. India,* p. 434, pl. xc, fig. 6.

D. 106-116. V. 4. A. 83. C. 12. L. l. 108.

Length of head 5, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—upper very slightly or not in advance of lower; diameter $8\frac{1}{2}$ to $9\frac{1}{2}$ in length of head, 1 diam. apart, and 4 from end of snout. Angle of mouth below hind edge of lower eye, and midway between anterior end of snout and gill-opening. *Scales*—strongly ctenoid on coloured, cycloid on blind side. *Lateral lines*—two on each side, those on coloured side separated by 19 or 20 rows of scales. *Colour*—dark leaden brown on coloured side, with a large black blotch on opercle.

Hab. From Sind through the seas of India; the largest specimen obtained was 18 inches long.

1342. (7.) Cynoglossus arel.

Pleuronectes arel, *Bl. Schn. Syst. Ich.* p. 159.
Cynoglossus arel, *Day, Fish. India*, p. 434, pl. xcviii, fig. 2.

D. 104–114. V. 4. A. 85. C. 12. L. l. 95.

Length of head $4\frac{3}{4}$, height of body 5 in the total length. *Eyes*—small, half of upper in advance of the lower, 1 diam. apart; both eyes in anterior half of head. Angle of mouth upwards of 1 diam. behind hind edge of lower eye, and a little behind middle of length of head. *Scales*—slightly ctenoid on coloured, cycloid on blind side. *Lateral lines*—two on coloured side separated by 7 rows of scales, one on blind side. *Colour*—brownish on coloured side without markings.

Hab. Tranquebar.

1343. (8.) Cynoglossus dispar.

Cynoglossus dispar, *Day, Fish. India*, p. 434, pl. xcvi, fig. 2.

D. 109–112. V. 4. A. 90–94. C. 9. L. l. 110–115.

Length of head $5\frac{1}{2}$ to $5\frac{3}{4}$, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter 9 to 11 in the length of head, $\frac{1}{2}$ diam. apart, and 3 from end of snout; half of upper eye in advance of lower. Angle of mouth below hind edge of lower orbit, and much nearer to end of snout than to gill-opening. *Fins*—ventral adherent to anal. *Scales*—strongly ctenoid on coloured, cycloid on blind side; 18 or 19 rows between lateral lines of coloured side. *Lateral lines*—two on either side, the upper on blind side ceasing in about last fourth of body. *Colour*—brown, blotched all over with darker marks; fins yellowish, with numerous black spots.

Hab. Bombay and Madras; growing to $14\frac{1}{2}$ inches in length.

1344. (9.) Cynoglossus dubius.

Cynoglossus dubius, *Day, Journ. Linn. Soc., Zool.* xi, 1873, p. 525; *Fish. India*, p. 435, pl. xcv, fig. 2.

D. 110. V. 4. A. 88. C. 12. L. l. 104.

Length of head 4, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 20 in length of head, $8\frac{1}{2}$ diam. from end of snout, and 2 apart; upper very slightly in advance of lower. The maxilla extends 1 diam. of eye behind lower orbit; angle of mouth just behind middle of length of head. *Fins*—no right ventral, left attached to anal. *Scales*—cycloid on both sides. *Lateral lines*—two on coloured side separated where furthest apart by 21 rows of scales; two lateral lines on blind side. *Colour*—brownish, with indistinct blotches on the body.

Hab. Sind and Baluchistan; two specimens were captured, the larger 20 inches long, at Gwádar.

1345. (10.) Cynoglossus quadrilineatus.

Plagusia quadrilineata, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Pleuron.* p. 21.
Cynoglossus quadrilineatus, *Day, Fish. India*, p. 435 (see synon.).

D. 107. V. 4. A. 80–88. C. 12. L. l. 86.

Length of head 5 to $5\frac{1}{3}$, height of body 4 in total length. *Eyes*—upper slightly in advance of lower, 9 or 10 diam. in length of head, and 3 to $3\frac{1}{2}$ from end of snout. Angle of mouth in about middle of length of head. *Fins*—a single ventral attached to anal. *Scales*—ctenoid on coloured, cycloid on blind side. *Lateral lines*—two on left side separated by 14 or 15 rows of scales; two also on blind side. *Colour*—brownish on left side, a darkish blotch covering opercles.

Hab. Red Sea, Sind, seas of India to the Malay Archipelago.

1346. (11.) Cynoglossus brachyrhynchus.

Plagusia brachyrhynchos, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Pleuron.* p. 24.
Cynoglossus brachyrhynchus, *Day, Fish. India*, p. 435, pl. xcvi, fig. 4 (see synon.).

D. 106. V. 4. A. 78. C. 12. L. l. 90–94.

Length of head $4\frac{3}{4}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—in anterior half of the head, the upper slightly in advance of lower; diameter 13 in length of head, $4\frac{1}{2}$ diam. from end of snout, about 1 apart. Angle of mouth slightly behind posterior margin of lower eye, and rather nearer the snout than the gill-opening. *Fins*—no right ventral. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, separated by 17 or 18 rows of scales; a single one on blind side. *Colour*—brown, irregularly marbled with darker, the opercles sometimes with a dark blotch.

Hab. Calcutta and Moulmein, in brackish waters but within tidal reach; also the Malay Archipelago.

1347. (12.) Cynoglossus bengalensis.

Plagusia bengalensis, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng. Hind.* p. 152, t. vi, fig. 3.
Cynoglossus bengalensis, *Day, Fish. India*, p. 435, pl. xcvii, fig. 4 (see synon.).

D. 101–103. V. 4. A. 78–80. C. 12. L. l. 90–95.

Length of head 5, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—the upper very slightly in advance of the lower; diameter 10 or 11 in length of head, 3 to $3\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ apart. Angle of mouth below middle or end of lower orbit. *Fins*—a single ventral attached to anal. *Lateral lines*—two on coloured side, separated where furthest apart by 13 or 14 rows of scales; a single lateral line on blind side. *Scales*—ctenoid on both sides. *Colour*—stone, marbled darker.

Hab. Hooghly at Calcutta.

1348. (13.) Cynoglossus hamiltonii.

Cynoglossus hamiltonii, *Günther, Catal.* iv, p. 504; *Day, Fish. India*, p. 436, pl. xcv, fig. 3 (see synon.).

D. 101. V. 4. A. 76. C. 10. L. l. 105.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—close together and small, 15 diameters in length of head, the upper slightly in advance of the lower Angle of mouth 1 diam. behind lower eye, and much nearer to snout than to gill-opening. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, divided by 15 or 16 rows of scales; a single lateral line on blind side. *Colour*—brown, with some irregular transverse bands and blotches of a darker colour; fins dark with light edges, each scale with a dark line along its centre.

Hab. Hooghly at Calcutta, seas and estuaries of India; attaining about 6 inches in length.

1349. (14.) Cynoglosuss lida.

Plagusia lida, *Bleeker, Batavia Nat. Tijdsch.* i, p. 413.
Cynoglossus lida, *Day, Fish. India*, p. 436, pl. xcvii, fig. 3 (see synon.).

D. 99–104. V. 4. A. 75–83. C. 12. L. l. 90.

Length of head 5, height of body 4 to $4\frac{2}{3}$ in the total length. *Eyes*—diameter about 13 in length of head, $4\frac{1}{2}$ diam. from end of snout, and nearly 1 apart. Half of upper eye in advance of lower. Angle of mouth below hind edge of lower orbit and midway between snout and gill-opening. *Fins*—ventral not united to anal. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, separated at their greatest distance by 13 rows of scales. A single lateral line on blind side. *Colour*—brownish, a dark mark on opercle.

Hab. Burmah to the Malay Archipelago.

1350. (15.) Cynoglossus semifasciatus.

Cynoglossus semifasciatus, *Day, Fish. India*, p. 436, pl. xcvii, fig. 5.

D. 98–103. V. 4. A. 75–80. L. l. 85.

Length of head $4\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—close together, the upper scarcely in advance of the lower; 8 diameters in length of head, and $2\frac{1}{2}$ from end of snout. Angle of mouth 1 diameter behind posterior edge of lower eye and slightly nearer to snout than to gill-opening. *Fins*—a single ventral attached to anal. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, separated where furthest apart by 12 or 13 rows of scales; a single lateral line on blind side. *Colour*—deep brown, with vertical incomplete or half bands irregularly disposed; they extend on to dorsal and anal fins.

Hab. Madras.

1351. (16.) Cynoglossus puncticeps.

Plagusia puncticeps, *Richards. Ich. China*, p. 280.
Cynoglossus puncticeps, *Day, Fish. India*, p. 437, pl. xcvii, fig. 1 (see synon.).

D. 94–100. V. 4. A. 74–80. C. 12. L. l. 95–100.

Length of head $5\frac{1}{4}$ to $5\frac{2}{3}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $8\frac{1}{2}$ in length of head, nearly 3 diam. from end of snout, and close together; the upper one half in advance of the lower. Angle of mouth situated below middle or last third of eye. *Fins*—right ventral absent. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, separated by 16 or 17 rows of scales; a single one on blind side. *Colour*—on left side reddish brown, with irregular vertical bands which are continued on the dorsal and anal fins.

Hab. From Sind through the seas of India to the Malay Archipelago and China.

1352. (17.) Cynoglossus brevis.

Cynoglossus brevis, *Günther, Catal.* iv, p. 500; *Day, Fish. India*, p. 437, pl. xcvii, fig. 2.

D. 95. V. 4. A. 70–75. C. 12. L. l. 96.

Length of head $5\frac{1}{2}$ to $5\frac{2}{3}$, height of body $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—situated close together, the upper slightly in advance of the lower; diameter 9 to 10 in length of head, 3 diam. from end of snout. Angle of mouth beneath middle of lower eye. *Fins*—a single ventral attached to the anal. *Lateral lines*—two on coloured side, separated where furthest apart by 17 or 18 rows of scales; a single lateral line on blind side. *Scales*—ctenoid on both sides. *Colour*—rich purplish brown, with vertical bands extending on to the fins.

Hab. Hooghly at Calcutta.

1353. (18.) Cynoglossus brevirostris.

Cynoglossus brevirostris, *Day, Fish. India*, p. 437, pl. xcvii, fig. 6.

D. 91. V. 4. A. 76. C. 13. L. l. 78.

Length of head 5, height of body $4\frac{1}{4}$ in the total length. *Eyes*—minute; situated rather close together, half of upper in advance of lower. Angle of mouth 1 diam. behind lower eye, and situated nearer to end of snout than to gill-opening. *Fins*—ventral united to anal. *Scales*—ctenoid on both sides. *Lateral lines*—two on coloured side, separated where furthest apart by 10 rows of scales; a single lateral line on blind side. *Colour*—brownish.

Hab. Madras, where a single specimen was procured.

Order IV. LOPHOBRANCHII.

Fishes having a dermal, segmental skeleton, with the opercular pieces reduced to a single plate. Gill-openings small; gills consisting of small rounded tufts attached to the branchial arches. Muscular system very slightly developed. Snout produced; mouth terminal, but small. Teeth absent. Air-bladder stated to be destitute of a pneumatic duct.

The fishes which compose this order are known as "pipe fishes;" they normally swim in a vertical position, the dorsal fin being the principal propeller. A single family is Indian.

Family I. SYNGNATHIDÆ.

Gill-openings small, round, and situated at the upper posterior angle of the gill-cover. A single dorsal fin. Ventrals, and occasionally one or more of the other fins, absent.

Synopsis of Indian Genera.

First group. SYNGNATHINA.

Tail not prehensile; a caudal fin generally present.

A. Pectorals present.
 a. Males with an egg-pouch on tail.
  Dorsal edges of trunk and tail not continuous. 1. SYNGNATHUS.
  Dorsal edges continuous .... 2. ICHTHYOCAMPUS.
 b. Males with egg-pouch on abdomen .... 3. DORYICHTHYS.
B. Pectorals wanting, caudal rudimentary or absent. 4. NEROPHIS.

Second group. HIPPOCAMPINA.

Tail prehensile; no caudal fin.

A. Body depressed .... 5. GASTROTOCEUS.
B. Body compressed; occipital crest without coronet. 6. ACENTRONURA.
C. Body compressed; occipital crest with coronet. 7. HIPPOCAMPUS.

First group. SYNGNATHINA.

1. Genus **SYNGNATHUS**, Artedi.

Syn. *Corythoichthys, Trachyrhamphus,* and *Halicampus,* Kaup.

Body with more or less distinct ridges; the dorsal edge of the trunk not continuous with that of the tail; humeral bones firmly united with the breast-ring. Dorsal fin either opposite to the vent or nearly so; pectorals well developed; caudal present. An egg-pouch on the tail in the males, the eggs covered by cutaneous folds.

Geographical Distribution. Tropical and temperate seas, some entering fresh waters.

Synopsis of Indian Species.

A. No bony ridge on opercle.
  Snout less than half length of head; a serrated crest .... 1. *S. serratus*, p. 461.
  Snout more than half length of head; no serrated crest .... 2. *S. longirostris*, p. 461.
  Snout half length of head; no serrated crest .... 3. *S. intermedius*, p. 462.

B. A bony ridge across opercle.
  Tail $\frac{3}{5}$ of total length. D. 23–27 .... 4. *S. spicifer*, p. 462.
  Tail $\frac{7}{11}$ of total length. D. 20–23..... 5. *S. cyanospilus*, p. 463.
  Tail more than $\frac{2}{3}$ of total length. D. 29–32 .... 6. *S. conspicillatus*, p. 463.

1354. (1.) Syngnathus serratus. (Fig. 164.)

Syngnathus serratus, *Temm. & Schleg. Faun. Japon., Poiss.* p. 272, pl. cxx, fig. 4; *Day, Fish. India*, p. 677, pl. clxxiii, fig. 4 (see synon.).

Kadil cudray and *Cul-pamboo*, Tamil; *Vála*, Maráthi; *Goorahpoo subbookoo*, Tel.

D. 25–27. P. 17. A. 4. C. 6. Osseous rings 21–25 + 45–47.

Length of head 5 to 6 in distance between end of snout and vent; trunk from above $\frac{1}{2}$ to nearly $\frac{2}{3}$ of the total length. *Eyes*—large, situated in middle of head. A spinous or serrated crest along upper edge of posterior $\frac{2}{3}$ of snout. Length of snout less than $\frac{1}{2}$ of length of head; interorbital space broad, with the orbital edges prominent, smooth; opercle finely striated. Body scarcely deeper than broad; dorsal fin with the base elevated, standing on

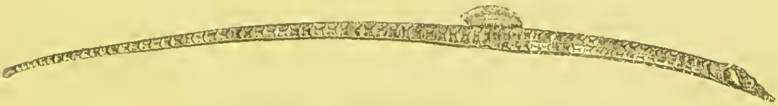

Fig. 164.—*Syngnathus serratus.*

5 or 6 rings, 2 anterior to the anal ring; caudal fin extremely small; egg-pouch more than half as long as tail. *Lateral line*—bent downwards and passing into lower edge of tail. *Colour*—light brown with light spots along the side, and the body banded in rings; tail-fin black with a white lower edge; a dark mark at base of anterior dorsal rays, and a dark line along the middle of the fin.

Hab. Seas of India to China.

1355. (2.) Syngnathus longirostris.

Trachyrhamphus longirostris, *Kaup, Lophobr.* p. 24.
Syngnathus longirostris, *Day, Fish. India*, p. 677, pl. clxxiii, fig. 5 (see synon.).

D. 27. P. 18. A. 4. Osseous rings 23+49.

Length of head $3\frac{3}{4}$ in distance between snout and vent; length of head and trunk to vent scarcely more than $\frac{1}{3}$ total length. Egg-pouch not $\frac{1}{2}$ as long as tail. *Eyes*—$\frac{1}{4}$ length of snout and situated in posterior half of head. Body deeper than broad. Length of snout more than half length of head. Interorbital space nearly flat. Opercle covered with fine radiating lines. *Fins*—dorsal low, it commences on the third body-ring before the anal one, it is situated on 7 rings and has its base elevated. *Colour*—greyish brown, with dark rings; under surface of snout light-coloured with dark spots.

Hab. (? Ceylon), Madras and China.

1356. (3.) Syngnathus intermedius.

Trachyrhamphus intermedius, *Kaup, Lophobr.* p. 24.
Syngnathus intermedius, *Day, Fish. India,* p. 678, pl. clxxiii, fig. 6 (see synon.).

D. 28. P. 18. A. 4. C. 9. Osseous rings 24–25+48–49.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$ in distance between snout and vent; length of head and trunk to vent $\frac{2}{5}$ total length. Egg-pouch $\frac{2}{5}$ length of tail. *Eyes*—diameter $3\frac{1}{2}$ in length of snout and situated in posterior half of head. Body deeper than broad. Length of snout $\frac{1}{2}$ that of head, and without any elevated ridge along its upper surface except a projection above nostrils. Interorbital space slightly concave, supraorbital ridges well developed. Opercle with fine radiating lines. *Fins*—dorsal of moderate height, it commences on the third body-ring before the anal one, it is situated on 6 or 7 rings, and has its base elevated. Length of caudal fin half that of snout. *Colour*—greyish, banded; dorsal fin spotted.

Hab. A pair captured at Madras.

1357. (4.) Syngnathus spicifer.

Syngnathus spicifer, *Rüppell, N. W., Fische,* p. 143, t. 33, fig. 4; *Day, Fish. India,* p. 678, pl. clxxiv, fig. 1 (see synon.).

Ea-de or *Lak-atha-dah* (Turtle's tail), Andamanese.

D. 23-27. P. 16. A. 2. C. 8. Osseous rings 15–16+39–42.

Length of head $2\frac{2}{3}$ in distance between snout and vent; length of head and trunk to vent $\frac{2}{5}$ of total length. *Eyes*—diameter nearly 6 in length of head, 3 diam. from end of snout. Gill-cover crossed by a raised longitudinal keel; an elevated ridge along upper edge of snout extending to nape. Interorbital space concave. Body compressed, higher than wide; ventral edge very prominent. Length of egg-pouch rather more than $\frac{1}{2}$ that of tail. *Fins*—dorsal situated on first five rings of tail; anal rays are minute and sometimes imperceptible. Rings with smooth edges, the divisions between them but little apparent. *Colour*—generally light brownish, with

a dark brown streak extending from orbit to angle of mouth, and a second from posterior angle of eye over opercle; a few black spots on under surface of lower jaw; body inferiorly with fine brown bars. Dorsal fin barred with brown spots; caudal blackish with a light brown base.

Hab. Seas, estuaries, and fresh waters of Red Sea, east coast of Africa, India, and the Malay Archipelago; ascending rivers high above the influence of the tides, even into fresh water; and growing to about 5 inches in length.

1358. (5.) Syngnathus cyanospilus.

Syngnathus cyanospilos, *Bleeker, Batavia Nat. Tjidsch.* vi, p. 114; *Day, Fish. India,* p. 678 (see synon.).

D. 20–23. P. 14. A. 4. C. 10. Osseous rings 12–15+33–35.

Length of head $3\frac{1}{3}$ in distance between snout and vent; length of trunk $\frac{4}{11}$ of total length. *Eyes*—diameter 6 to $6\frac{1}{2}$ in length of head. Snout much longer than postocular region, and as long as distance from eye to middle of pectoral fin. A low median ridge along the snout, crown, and nape; a second along side of head. *Fins*—dorsal on six rings commencing with the last body-ring. *Colour*—body with irregular brown cross bars, each with a white posterior edge; black dots on dorsal.

Hab. East coast of Africa, seas of India, and the Malay Archipelago.

1359. (6.) Syngnathus conspicillatus.

Syngnathus conspicillatus, *Jenyns, Voy. Beagle, Fish.* p. 147, pl. xxvii, fig. 4; *Day, Fish. India, Suppl.* p. 808 (see synon.).

D. 29–32. P. 14. A. 3. C. 10. Osseous rings 16–17+34–37.

Length of head about $10\frac{1}{2}$ in the total length; tail more than twice as long as body. Snout slender. The upper profile of the head rises abruptly above the eyes. Opercle crossed by a ridge; a median ridge on occiput and nuchal shields; a supra-orbital ridge is continued along each side of crown. Body slightly deeper than broad, ridges well developed; egg-pouch not quite half so long as tail. *Fins*—dorsal commences on anal or first caudal ring. *Colour*—trunk greyish brown, with deep brown interrupted transverse bands, and sometimes large white intermediate spots. Fine brown lines on head, and a band below eye over lower side of opercle. Dorsal fin a little spotted.

Hab. From the east coast of Africa to the Pacific Ocean; Jaffna, Ceylon (Haly, Taprobanian, i, 1886, p. 165).

2. Genus ICHTHYOCAMPUS, Kaup.

The ridges of the concave back and tail are continuous, and are continued (although sometimes very indistinctly) to the caudal fin.

Dorsal fin nearly or quite opposite to the vent. Pectorals and caudal present. Males with an egg-pouch, having a cutaneous covering, situated on the tail.

Geographical Distribution. Seas of India to Australia.

1360. (1.) Ichthyocampus carce. (Fig. 165.)

Syngnathus carce, *Ham. Buch. Fish. Ganges*, pp. 13, 362.
Ichthyocampus carce, *Day, Fish. India*, p. 679, pl. clxxiv, fig. 2 (see synon.).

D. 23–26. P. 17. A. 2. C. 6. Osseous rings 15–16 + 38–40.

Length of head $3\frac{1}{2}$ in distance between snout and vent; the latter distance $2\frac{2}{3}$ in the total length. *Eyes*—diameter 6 in length of head, nearly 3 diam. from end of snout, and $\frac{1}{3}$ diam. apart. Body higher than wide. Interorbital space slightly concave, with a sharp low median ridge passing along snout; another in occipital region. A very sharp straight ridge across opercle. Egg-pouch about $\frac{1}{2}$ as long as tail. *Fins*—dorsal situated on second to eighth

Fig. 165.—*Ichthyocampus carce.*

caudal rings. *Colour*—deep brown, with one—occasionally two—milk-white spots in centre of each body-ring along the infero-lateral ridge; lower surface of snout dotted with black spots; dorsal fin yellow; pectoral and caudal leaden colour; eye greenish blue.

Hab. Seas, estuaries, and fresh waters of India and Malay Archipelago; growing to about 5 inches in length.

3. Genus DORYICHTHYS, Kaup.

Syn. *Doryrhamphus, Chæroichthys,* and *Microphis,* Kaup; *Belonichthys,* Peters.

Ridges on body well developed. Dorsal fin situated opposite the vent and of moderate length or elongate; pectoral and caudal fins present. Humeral bones united. Male with egg-pouch on abdomen.

Geographical Distribution. Seas of the tropics, some species entering fresh waters.

Synopsis of Indian Species.

D. 50. Dorsal fin on 11 rings .... 1. *D. cuncalus*, p. 465.
D. 40–50. Dorsal on 9 rings .... 2. *D. bleekeri*, p. 465.
D. 30. Dorsal on 6 rings .... 3. *D. deocata*, p. 466.

1361. (1.) Doryichthys cuncalus. (Fig. 166.)

Syngnathus cuncalus, *Ham. Buch. Fish. Ganges*, pp. 12, 362.
Doryichthys cunculus, *Day, Fish. India*, p. 679, pl. clxxiv, fig. 4 (see synon.).

Kunnur dant, "Crocodile's teeth," Ooriah.

D. 50. P. 16–18. A. 2. C. 8–9. Osseous rings 17–18 + 25–27.

Length of head $4\frac{1}{2}$ in distance between snout and vent; trunk from snout to vent about $\frac{1}{2}$ total length. *Eyes*—of moderate size, situated in middle of head, and 3 diam. from end of snout. A fine ridge along upper surface of snout to between eyes; an elevated ridge divides the gill-cover into two halves. Snout somewhat elevated. Lateral line uninterrupted, it passes into lower

Fig. 166.—*Doryichthys cuncalus.*

border of first caudal ring. *Fins*—dorsal fin on 11 rings, 2 anterior to anal ring. *Colour*—green above, dirty white beneath; on the back several dusky lines intersect each other, forming a network; along either side a longitudinal spotted stripe; caudal reddish; eyes silvery; opercle burnished like silver.

Hab. Tidal rivers of Indian Peninsula, ascending far above tidal influence. This species attains 7 inches or more in length.

1362. (2.) Doryichthys bleekeri.

Microphis bleekeri, *Day, Fish. Malabar*, p. 265.
Doryichthys bleekeri, *Day, Fish. India*, p. 680, pl. clxxiv, fig. 3 (see synon.).

D. 40–45. P. 21. A. 2. C. 9. Osseous rings 21 + 22.

Length of head $3\frac{1}{3}$ in distance between snout and vent; trunk from snout to vent nearly $\frac{2}{3}$ total length. *Eyes*—slightly oval; diameter $7\frac{1}{2}$ in length of head, $4\frac{1}{2}$ diam. from end of snout, and $\frac{1}{2}$ diam. apart. Lateral line bends downwards and joins infero-lateral caudal ridge at base of ring behind anal one. Snout compressed; opercle with a horizontal ridge along its middle, and five more ridges below running to its posterior and inferior margins; a ridge on nape. *Fins*—dorsal upon 9 rings, the first the anal ring; pectoral wide and short; the caudal lanceolate and equal in length to half the snout. *Rings*—each ending in a moderately sharp spine posteriorly. In females there are sometimes two spines at end of each ring, and they are much sharper and longer than in males. *Colour*—a bright red line at gills and along lateral line, otherwise light brown with a dark line forward from the eye; under surface of snout barred with brown; fins light brown.

Hab. Not rare in the Alwaye river at Cochin; growing to at least 8 inches in length.

1363. (3.) Doryichthys deocata.

Syngnathus deocata, *Ham. Buch. Fish. Ganges*, pp. 14, 363.
Doryichthys deocata, *Day, Fish. India*, p. 680 (see synon.).

D. 30. P. 15. A. ? C. 17 ? Osseous rings 16 + 32.

Snout longer than in *D. cuncalus*. *Fins*—dorsal on six rings, two of which belong to the body. *Colour*—generally brown; bright red under lateral line and dotted with blue. In Gray and Hardwicke's figure the lower surface is red, vertically banded with darker stripes edged with blue, at the upper end of each dark stripe is a white dot or angular mark.

Hab. Rivers of Bengal and Behar.

4. Genus NEROPHIS, Rafinesque.

Syn. *Netasomata*, Eichwald; *Scyphius*, Risso; *Entelurus*, A. Duméril.

Body rounded, and ridges when present very indistinct; the tail tapering to a point, caudal fin rudimentary or wanting. Dorsal fin of moderate length, placed opposite the vent; pectorals absent. Ova attached to loose integument of abdomen in males, and not covered by lateral cutaneous folds.

Geographical Distribution. Bombay, Atlantic, and the coasts of Europe.

1364. (1.) Nerophis dumerilii.

Nerophis dumerilii, *Steindachner, Sitzungsb. Ak. Wiss. Wien*, 1868, lvii, 1 Abth. p. 1002; *Day, Fish. India*, p. 680 (see synon.).

D. 37. C. 7. Osseous rings 27 + 65.

Length of trunk from snout to vent $\frac{1}{3}$ total length. Snout half as long as head. Forehead concave: an obtuse ridge above opercle continued to hind edge of orbit. *Fins*—dorsal commences behind twentieth ring; its base is on ten rings, 3 of which belong to the tail. Caudal rudimentary.

Hab. Bombay.

Second group. HIPPOCAMPINA.

5. Genus GASTROTOCEUS (Heckel), Kaup.

Syn. *Syngnathoides* and *Solegnathus*, Bleeker.

Body depressed, having smooth shields and a prehensile tail, which is not so long as the body. Pectorals and anal present; caudal absent. The lateral line passes along the edge of the abdomen. Ova imbedded in soft integument on the abdomen of the males, but there is no pouch.

Geographical Distribution. Indian Ocean, China, and Australia.

1365. (1.) **Gastrotoceus biaculeatus.** (Fig. 167.)

Syngnathus biaculeatus, *Bloch, Ausl. Fische,* iv, p. 10, t. 121.
Gastrotokeus biaculeatus, *Kaup, Lophobr.* p. 19; *Day, Fish. India,* p. 681, pl. clxxiv, fig. 5 (see synon.).

D. 40–45. P. 17–23. A. 4. Osseous rings 16–18 + 45–55.

Length of head about 3 in distance between snout and vent; tail shorter than trunk. *Eyes*—nearer to base of pectoral fin than to end of snout. A well-defined supraorbital spine above hind edge of eye; interorbital space concave. Occiput with a distinct

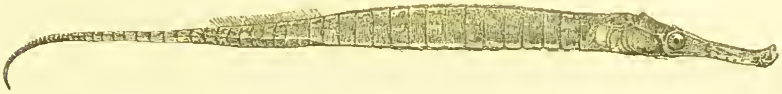

Fig. 167.—*Gastrotoceus biaculeatus.*

blunt projection; usually a barbel-like filament on mandible, and in some examples cutaneous filaments on lower surface of jaws and on body. *Fins*—dorsal on 10 rings, commencing on that anterior to the anal, or on anal ring. Anal fin in a depression; a projection covered with well-developed papillæ just in front of vent. *Colour*—varies in different localities. Pale green or brown above, orange or buff on the under surface, a light spot edged with very pale vermilion on side of each body-ring: in some, black spots are scattered along sides of abdomen. Lower surface of head with dark spots or bands.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, China, and Australia; attaining to at least $9\frac{3}{4}$ inches in length.

6. Genus ACENTRONURA, Kaup.

Body rather compressed, with shields without tubercles, and a prehensile, finless tail; occiput compressed into a crest without any coronet. Pectorals present. Ova carried by the males in a sac, which is situated below the tail and opens near the vent.

1366. (1.) **Acentronura gracillima.** (Fig. 168.)

Hippocampus gracillimus, *Temm. & Schleg. Faun. Japon., Poiss.* p. 274, t. cxx, fig. 6.
Acentronura gracillima, *Day, Fish. India,* p. 681, pl. clxxvi, fig. 1 (see synon.).

D. 16–17. P. 15. A. 2. Osseous rings 13 + 41–45.

Tail a little longer than body. Snout $\frac{2}{5}$ length of head. *Fins*—dorsal on four rings, two of which belong to the tail; its base not elevated. *Colour*—brownish, covered with small white dots and little brown markings, which in the female almost form bands, especially across ventral surface. A row of dark spots along upper third of dorsal fin, forming a band. *Male* darker and of a bluish colour, with a milk-white spot on each body-ring.

Hab. Japan and the Andamans, where two small specimens were

Fig. 168.—*Acentronura gracillima.*

dredged by Mr. J. Wood-Mason, in 35–40 fathoms. Greatest known length 3 inches.

7. Genus HIPPOCAMPUS, Leach.

Trunk compressed and somewhat elevated, with from 10 to 12 rings. The shields furnished with tubercles or spines. Occiput compressed and forming a coronet at its posterior upper angle, which is usually surmounted by spines or knobs. Pectoral fins present; the tail prehensile and finless. Males furnished with an egg-sac situated below the tail and opening near the vent.

Geographical Distribution. Generally distributed throughout tropical and temperate seas. These fishes attach themselves (by means of their prehensile tails) to floating substances and are carried for long distances; they are consequently widely distributed.

Synopsis of Indian Species.

D. 19–20.	Tubercles variable	1. *H. trimaculatus*, p. 468.
D. 16–17.	Tubercles blunt	2. *H. guttulatus*, p. 469.
D. 17–18.	Tubercles developed into spines..	3. *H. hystrix*, p. 469.

1367. (1.) Hippocampus trimaculatus. (Fig. 169.)

Hippocampus trimaculatus, *Leach, Zool. Misc.* i, p. 104; *Day, Fish. India*, p. 682, pl. clxxiv, fig. 7 (see synon.).

D. 19–20. P. 17. A. 4. Osseous rings 11 + 36.

Eyes—diameter 8 in length of head. Length of snout equals

Fig. 169.—*Hippocampus trimaculatus.*

distance between front edge of the eye and gill-opening. Tubercles

variously developed, in some long and acute, in others low; coronet similarly high or low, with a tubercle anteriorly, and surrounded by 5 rudimentary or well-developed spines; a low supraorbital spine. *Fins*—dorsal situated upon last 2 rings of trunk and first of tail. *Colour*—pale yellow-ochre; two rows of blackish spots along dorsal fin, and occasionally three large brown blotches along edge of back on first, fourth, and seventh body-rings; in some there are numerous fine black dots over body. Sometimes light marks exist on side of back, and the body is banded.

Hab. Andamans, Tenasserim to Pinang, and the seas of China.

1368. (2.) Hippocampus guttulatus.

Hippocampus guttulatus, *Cuv. Règne Anim.* 2e éd. 1829, ii, p. 363; *Day, Fish. India*, p. 682, pl. clxxiv, fig. 6 (see synon.).

D. 16–17 (18). P. 17. A. 4. Osseous rings 11+33.

Eyes—diameter 6 to 7 in length of head, anterior margin of the orbits midway between end of snout and posterior extremity of head. Two supraorbital spines directed backwards and outwards. Coronet rather low, with from 4 to 6 blunt tubercles. Tubercles on body and tail generally obtuse. *Fins*—dorsal fin on last two body- and first two tail-rings. *Colour*—varies, generally greyish marbled with darker and covered with light or dark spots; or brown with black spots or cross bands. Dorsal fin sometimes having a dark intramarginal band with a white outer edge.

Hab. Red Sea, Indian Ocean to Japan, also tropical parts of the Atlantic; attaining 11 or 12 inches in length.

1369. (3.) Hippocampus hystrix.

Hippocampus histrix, *Kaup, Lophobr.* p. 17, t. 2, fig. 5.
Hippocampus hystrix, *Günther, Catal.* viii, p. 206; *Day, Fish. India*, p. 683, pl. clxxvi, fig. 2 (see synon.).

D. 17–18. P. 16. Osseous rings 11+36–37.

Coronet high, with 5 spines, and a tubercle anteriorly, in front of which is another spine. Snout slender, as long as distance between front margin of orbit and first nuchal spine; several spines round orbit. All tubercles (except those on end of tail) in the form of slender and pointed spines. *Colour*—grey, or yellowish white, with numerous brown and smaller white dots; 6 or 7 light patches on tail, covered with dark spots, and one or more similar spots on the body. Snout dark, with light ring. Each spine black at the tip.

Hab. Zanzibar, Reunion, Aden, Andamans, and Japan. An example from Aden in the Calcutta Museum is 4·5 inches long.

Order V. PLECTOGNATHI.

Skeleton incompletely ossified: vertebræ few. Gill-openings narrow, immediately in front of the pectoral fins; gills pectinate. Head often large. Mouth narrow; bones of the upper jaw mostly united. A single soft-rayed dorsal fin belonging to the caudal portion of the vertebral column, and opposite the anal; a rudimentary spinous dorsal is also present in some forms; ventrals, when existing, in the form of spines. Skin either smooth, or with rough scales, or ossified in the form of plates or spines. Air-bladder destitute of a pneumatic duct.

Geographical Distribution. Mostly marine, but a few species are found in large rivers, and several in estuaries in temperate and tropical portions of the globe.

Synopsis of Indian Families.

I. Distinct teeth in the jaws...................... **Sclerodermi.**
II. Jaws modified into a beak .... **Gymnodontes.**

Family I. SCLERODERMI.

Body compressed or angular; snout somewhat produced. Distinct teeth in small numbers in the jaws. The elements of a spinous dorsal and of ventral fins generally present, but variously modified. Skin rough or spiny, or the scales in the form of a firm carapace.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

First group. TRIACANTHINA.

Body compressed, dermal scutes small, rough, scale-like; a pair of strong ventral spines.

Spinous dorsal with from 4 to 6 spines .... 1. TRIACANTHUS.

Second group. BALISTINA.

Body compressed, dermal covering rough or with movable scutes; ventrals, if present, consisting of a single pelvic projection.

Three dorsal spines, no barbel .... 2. BALISTES.
One or two dorsal spines, no barbel .... 3. MONACANTHUS.
A barbel under chin; one dorsal spine .... 4. ANACANTHUS.

Third group. OSTRACIONTINA.

Body angular, dermal covering forming a carapace.

Spinous dorsal and ventral fins wanting .... 5. OSTRACION.

First group. TRIACANTHINA.

1. Genus **TRIACANTHUS**, Cuvier.

Body oblong, compressed, ending in a somewhat elongated tail. Eyes lateral, high up, situated near the hind edge of head. Teeth in two rows in both jaws, the outer incisor-like; the inner more molariform. First dorsal fin consisting of a long and strong spine, followed by from 3 to 5 smaller and weak ones; ventrals formed by a pair of strong spines articulated by a joint or ossified to the pelvic bones; caudal lobed. Scales minute and rough. Lateral line present. Air-bladder strong.

Geographical Distribution. Seas of India and Australia.

Synopsis of Indian Species.

Second dorsal spine about as long as third..	1. *T. brevirostris*, p. 471.
Second dorsal spine 3 times as long as third.	2. *T. strigilifer*, p. 472.

1370. (1). **Triacanthus brevirostris.** (Fig. 170.)

Triacanthus brevirostris, *Temm. & Schleg. Faun. Japon., Poiss.* p. 294, t. 129, fig. 2; *Day, Fish. India*, p. 685, pl. clxxv, fig. 1 (see synon.).

Bowree or *Abatoo*, Tel.; *Satura*, Ooriah; *Moolean*, Tamil; *Ko-tah-thoo-lay-po-dah*, Andamanese; *Ankatilla*, Singhalese; *Turgoorch*, Baluchistan; *Ghoda*, Maráthi.

B. vi. D. 5 | 22–25. P. 14. V. 1. A. 16–20. C. 12.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total

Fig. 170.—*Triacanthus brevirostris.*

length. *Eyes*—high up; diameter 4 in length of head, $2\frac{1}{2}$ diameters

from the end of snout, and $1\frac{1}{3}$ apart. *Teeth*—outer row in upper jaw 8, inner row 6, the two middle ones longest; in the mandibles 10 in outer and 2 in inner row, smaller than those in upper jaw, but otherwise similar. *Fins*—first dorsal spine very strong; second and third spines weak and about equal in length; dorsal fins close together in the very young, not so in the adult. Anal highest anteriorly, its lower edge concave, the length of its base $\frac{2}{3}$ of that of the head. *Colour*—silvery, with a black spot on the first dorsal fin, extending a short distance on to the back; usually a dark supraorbital blotch.

Hab. Seas of India to the Malay Archipelago, and Japan; attaining at least $9\frac{1}{2}$ inches in length.

1371. (2.) Triacanthus strigilifer.

Triacanthus strigilifer, *Cantor, J.A.S.B.* xviii, p. 1345, pl. ix; *Catal.* p. 363; *Day, Fish. India,* p. 685, pl. clxxv, fig. 2 (see synon.).

Rama moolean, Tamil.

B. vi. D. 5 | 22. P. 14. V. 1. A. 15–16. C. 12.

Length of head 4 to $4\frac{1}{4}$, height of body $3\frac{3}{4}$ in the total length. *Eyes*—high up; diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, $2\frac{1}{3}$ diameters from end of snout, and $1\frac{1}{4}$ apart. *Teeth*—8 form outer row in upper jaw, 4 the inner row; 10 in outer and 2 in inner row of lower jaw. *Fins*—first dorsal spine very strong and longer than the head, the others weak; the second more than $\frac{1}{2}$ as long as the head and 3 times as long as the third; length of base of anal only about $\frac{1}{2}$ that of head. *Colour*—silvery, with some wide irregular yellow lines and blotches on head and body.

Hab. Persian Gulf, seas of India to the Malay Archipelago, China, and the Philippines.

Second group. BALISTINA.

2. Genus **BALISTES**, Linn.

Syn. *Balistapus,* Tiles.; *Xenodon, Erythrodon,* and *Pyrodon,* Rüppell; *Melichthys* and *Leiurus,* Swainson.

Kend, Maráthi.

Branchiostegals six. Body compressed. No barbels. Upper jaw with a double series of incisor-like teeth, 8 in the outer, 6 in the inner row; mandibles with 8 similar teeth in one row. The first dorsal fin consisting of a strong spine succeeded by two weak ones; ventrals as an osseous appendage. Scales forming a carapace.

Geographical Distribution. Tropical and subtropical seas.

Eating the flesh of these fishes occasions in places symptoms of most virulent poisoning.

Synopsis of Indian Species.

A. Free portion of tail depressed. L. tr. 26 * .. 1. *B. stellaris*, p. 473.
B. Free portion of tail compressed.
  a. Teeth white, uneven, notched.
    a'. A groove before eye.
      a''. No enlarged osseous scutes behind gill-opening. L. tr. 28............ 2. *B. maculatus*, p. 474.
      b''. Enlarged osseous scutes behind gill-opening.
        α. No spines at side of tail.
          Cheeks covered with scales. L. tr. 35–37.................... 3. *B. vetula*, p. 475.
          Cheeks with rows of tubercles a little apart. L. tr. 27–31...... 8. *B. fuscus*, p. 477.
        β. Spines at side of tail.
          aa. Cheeks entirely scaled.
            Black, yellow lips; tail white-tipped. L. l. 45–47 .... 4. *B. niger*, p. 475.
            Brown, yellow ring round lips. L. l. 55–65 .... 5. *B. mitis*, p. 475.
            Dark, large white spots along lower half of body .... 6. *B. conspicillum*, [p. 476.
            Brownish olive, lips black. L. l. 30–34 .... 7. *B. viridescens*, [p. 476.
          bb. Cheeks not entirely scaled. L. tr. 19–21 .... 9. *B. flavimarginatus*, [p. 477.
        γ. ? spines at side of tail; olive-green, with numerous purple bands ...... 10. *B. ellioti*, p. 478.
    b'. No groove before eye.
      Greyish, blue bands from eye to pectoral, white oblique stripes above anal ...... 11. *B. aculeatus*, p. 478.
      Olive, a broad black blue-edged band from eye to anal .... 12. *B. rectangulus*, [p. 478.
      Brownish, with numerous curved yellow lines on sides .... 13. *B. undulatus*, p. 479.
  b. Teeth white, even, incisor-like .... 14. *B. buniva*, p. 479.
  c. Teeth reddish brown; lower jaw projecting. L. tr. 17 .... 15. *B. erythrodon*, [p. 480.

1372. (1.) Balistes stellaris. (Fig. 171.)

Balistes stellaris, *Bl. Schn. Syst. Ich.* p. 476.
Balistes stellatus, *Day, Fish. India*, p. 687, pl. clxxvii, fig. 1 (see synon.).

D. 3 | 26–27. P. 15. A. 24–25. C. 13. L. l. 42–46. L. tr. 26.

Length of head $3\frac{3}{4}$ to $4\frac{1}{2}$, height of body $2\frac{2}{3}$ to 3 in the total length. *Eyes*—diameter $2\frac{1}{4}$ to $2\frac{3}{4}$ from end of snout and $1\frac{1}{3}$ apart; a groove in front of eye. *Teeth*—uneven, notched. Tail posteriorly depressed. *Fins*—ventral spine movable. Posterior edge of caudal concave, ends of lobes often produced in adults. *Scales*—covering cheeks; some enlarged scutes behind gill-opening. Two ridges on either side of tail in adults, represented in the young by spines on the scales. *Colour*—generally grey, dashed with olive-green. Three large white blotches extend from back some distance down sides;

* From origin of second dorsal fin to that of anal.

numerous small bluish spots scattered over the back; lower half of body white, with light green bands and spots, or numerous yellow spots on the abdomen; 3 or 4 yellow lines from mouth towards base of pectoral. Pectoral yellow with a dark base. First dorsal nearly white, with irregular dark bands, and shorter yellow bands with dark edges. Second dorsal diaphanous, with 7 or 8 tortuous

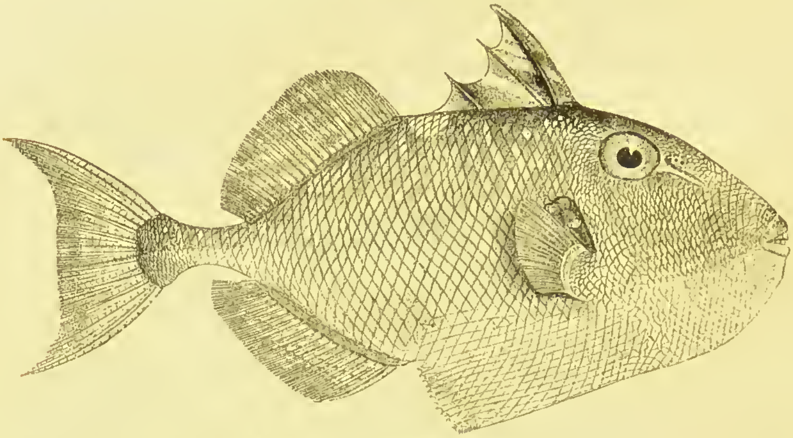

Fig. 171.—*Balistes stellaris.*

almost horizontal olive bands. Caudal light grey, with tortuous vertical white lines. Anal light brown, with 5 white bands. *Young* —an example 1 inch long is white, with a broad black interorbital band; black along the upper $\frac{1}{3}$ of the sides, with 4 white blotches over the back.

Hab. Seas of India and throughout the Indian and Pacific oceans. This is the commonest species of the genus at Madras, and attains at least 2 feet in length.

1373. (2.) Balistes maculatus.

Balistes maculatus, *Gmel. Syst. Nat.* i, p. 1468; *Day, Fish. India*, p. 687, pl. clxxv, fig. 3 (see synon.).

D. 32 | 6–27. P. 15. A. 24–25. C. 12. L. l. 46–55. L. tr. 28.

Length of head $3\frac{2}{3}$ to 4, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—2 to $2\frac{1}{2}$ diameters from end of snout and 2 apart. A groove in front of eye. *Teeth*—white, uneven, notched. *Fins*—anterior dorsal spine strong and nearly $\frac{1}{2}$ as long as the head. Ventral spine usually movable. Posterior edge of caudal convex or undulated. Second dorsal and anal high anteriorly, especially in adults. *Scales*—cheeks entirely scaled; no osseous scutes behind gill-opening. Scales rough and granulated, but without spines or prominent tubercles except in the immature. *Colour*—bluish black, young examples covered with numerous light blue blotches, more especially in the lower half of the body; these spots are less numerous and larger in adults. Dorsal spine black. Eyes hazel.

Hab. Indian, Pacific, and Atlantic Oceans. Very common at Madras, attaining at least 16 inches in length.

1374. (3.) Balistes vetula.

Balistes vetula, *Linn. Syst. Nat.* i, p. 406; *Day, Fish. India,* p. 688 (see synon.).

D. 3 | 30–32. P. 16. A. 29. C. 12. L. l. 50–60. L. tr. 35–37.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length, excluding the caudal filaments. *Eyes*—4 diameters from end of snout and $1\frac{1}{2}$ apart. A groove in front of eye. *Fins*—first dorsal commences just behind eye, its spine strong and half as long as head. In adults the anterior dorsal rays and caudal lobes may be filamentous. *Scales*—cheeks entirely scaly; a patch of enlarged scutes behind gill-opening. No spines or tubercles on side of tail. *Colour*—in the immature some oblique black lines along rows of scales. In adults there are two curved blue dark-edged bands along side of head, and some narrow black ones between the eyes over the head, also continued below eyes; caudal with its upper and lower edge blue, and a bluish band near its posterior extremity; transverse bluish bands on dorsal and anal fins.

Hab. Coromandel coast of India and tropical parts of Atlantic. An example in the Madras Museum is 15 inches in length.

1375. (4.) Balistes niger.

Balistes niger, *Mungo Park, Trans. Linn. Soc.* iii, p. 37; *Day, Fish. India,* p. 688, pl. clxxxi, fig. 1 (see synon.).

D. 3 | 26–28. P. 14. A. 23–25. C. 12. L. l. 45–47. L. tr. 23–26.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—4 diameters from end of snout and $1\frac{1}{3}$ apart. A groove in front of eye. *Teeth*—compressed and notched. *Fins*—first dorsal commences above first third of pectoral, anterior spine strong and $\frac{1}{2}$ as long as head. Ventral spine movable. Caudal truncated or undulated. *Scales*—entirely cover cheeks. Some osseous scutes behind gill-opening; 6 to 8 rows of small recurved spines on side of tail. *Colour*—rich brown, lips yellow and a yellow ring behind the lips; caudal dark, with a light upper and lower edge, and a white posterior extremity; second dorsal and anal yellow.

Hab. Red Sea, seas of India and Malay Archipelago.

1376. (5.) Balistes mitis.

Balistes mitis, *Bennett, P. Z. S.* 1831, p. 169; *Day, Fish. India,* p. 689, pl. clxxvii, fig. 3 (see synon.).

Rahtee Yellakah, Tel.

D. 3 | 29–31. P. 14. A. 26–28. C. 13. L. l. 55–65.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ from end of snout, and $1\frac{1}{4}$ to $1\frac{1}{2}$ apart. A well-marked groove in front of eye. *Teeth*—compressed, notched,

increasing in size anteriorly. *Fins*—first dorsal spine coarse, rather more than ½ length of head. Caudal with its posterior edge sinuous or truncated. *Scales*—cover cheeks; some enlarged scutes behind gill-opening; each scale in caudal region with a round tubercle, most distinct on 7 or 8 rows in middle of side. *Colour*—dull yellowish brown; pectoral and ventral spines straw-coloured; the other fins blackish with lighter bases, which posteriorly have a yellowish tint; ventral rays and membrane dark. A yellow band passes from round mouth towards base of pectoral.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1377. (6.) Balistes conspicillum.

Balistes conspicillum, *Bl. Schn. Syst. Ich.* p. 474; *Day, Fish. India,* p. 689 (see synon.).

D. 3 | 25–26. P. 14. A. 20–22. C. 12. L. l. 44–54. L. tr. 27–31.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of snout. A groove in front of eye. *Teeth*—white, compressed, notched. *Fins*—second dorsal and anal rather low. Ventral spine short, movable. Caudal rounded. *Scales*—covering cheeks and snout; some osseous scutes behind gill-opening; $2\frac{1}{2}$ or 2 whole and 2 half rows of tubercles on side of tail. *Colour*—brownish, with large round white or yellow blotches along lower half of body; below first dorsal a light patch in which are numerous dark spots. A white band across snout from eye to eye; a light ring round the mouth, with a narrow one behind it. Caudal fin with a dark band in its outer fourth edged with white.

Hab. Indian and Pacific Oceans.

1378. (7.) Balistes viridescens.

Balistes viridescens, *Bl. Schn. Syst. Ich.* p. 477; *Day, Fish. India,* p. 689, pl. clxxvii, fig. 2 (see synon.).

D. 3 | 24–26. P. 14. A. 23–24. C. 12. L. l. 30–34. L. tr. 17.

Length of head $3\frac{1}{3}$, height of body $2\frac{1}{2}$ to $2\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of snout, $1\frac{1}{2}$ diam. apart. A groove in front of eye. *Teeth*—white, compressed, notched. *Fins*—soft dorsal and anal rather elevated. Caudal truncated or rounded. *Scales*—covering cheeks and snout; some osseous scutes behind gill-opening. Four and a half rows of recurved spines on side of tail. *Colour*—a light ring round muzzle joining one from below, and dividing the black lip from a black band on the forehead; body brownish olive, each scale darkest in centre; a wide blackish band from eye to base of pectoral; vertical fins yellowish with dark margins and sinuous lines; large blue blotches on first dorsal; sometimes base of caudal dark.

Hab. Red Sea, east coast of Africa, Andamans to the Malay Archipelago.

1379. (8.) Balistes fuscus.

Balistes fuscus, *Bl. Schn. Syst. Ich.* p. 471; *Day, Fish. India,* p. 690, pl. clxxviii, fig. 4 (see synon.).

D. 3 | 25–26. P. 14. A. 23–26. C. 12. L. l. 45–55. L. tr. 27–31.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—$2\frac{1}{2}$ diameters from end of snout and 1 apart. Cheeks with naked grooves. *Teeth*—compressed and notched. *Fins*—dorsal commences above base of pectoral, its spine strong and $\frac{2}{3}$ length of head. Ventral spine movable. Caudal rounded in the young, truncated in the immature, deeply emarginate in the adult, with the outer rays often prolonged. *Scales*—those on cheeks in form of osseous tubercles, placed in rows a short distance apart; some osseous scutes behind the gill-opening; no spines on side of tail. *Colour*—dull yellow, with brown stripes and spots, which sometimes enclose spaces. Three dark narrow interorbital bands. Vertical fins spotted with dark in the young, with yellow in the adult. Old examples brown, with the vertical fins light-edged.

Hab. Red Sea, east coast of Africa, seas of India and Malay Archipelago; attaining upwards of a foot and a half in length.

1380. (9.) Balistes flavimarginatus.

Balistes flavimarginatus, *Rüpp. Atl. Fische,* p. 33; *id. N. W., Fische,* p. 54, t. xv, figs. 1, 2; *Day, Fish. India,* p. 690, pl. clxxviii, fig. 1 (see synon.).

D. 3 | 26–27. P. 15. A. 23–24. C. 14. L. l. 30–35. L. tr. 19–21.

Length of head $3\frac{2}{3}$, height of body $2\frac{1}{4}$ in the total length. *Eyes*—$3\frac{1}{2}$ diameters from end of snout and $1\frac{1}{2}$ apart. A groove in front of eye. *Teeth*—compressed and notched. *Fins*—ventral spine movable. Caudal rounded in the very young, truncated in the immature, deeply concave and having the lobes produced in adults. *Scales*—anterior part of snout partly covered with tubercular rudimentary scales; in adults the cheeks are not entirely scaled; a few scutes behind gill-opening. Four to six rows of rather small recurved spines on side of tail. *Colour*—above bluish stone, lighter on the sides and below, where it becomes buff. Lower surface of mouth and chest orange, fading into yellow; immature with dark spots in the centre of some of the scales; vertical fins with a dark base and a light outer half along the centre of which is a dark band. Adults nearly uniform in colour.

Hab. Red Sea, Andamans to the Malay Archipelago. The largest example I myself captured was 20 inches in length.

1381. (10.) Balistes ellioti, sp. nov.

Varri korawa, Tamil.

A groove in front of snout. *Fins*—second dorsal and anal rather high anteriorly; caudal deeply lunate. *Scales*—cover cheeks. *Colour*—olive, dashed with green along the back and sides, becoming light on the abdominal surface; four purplish bands along the cheek; numerous narrow purple bands extend obliquely along the whole length of the body, the superior ones ending along the dorsal profile, the inferior broken up. Vertical fins bluish, with a dark band along the base of each; caudal light grey, with carmine outer edges and posteriorly carmine edged with yellow.

Hab. Madras. Described from a figure in Sir W. Elliot's drawings. The figure is $8\frac{1}{2}$ inches long.

1382. (11.) Balistes aculeatus.

Balistes aculeatus, *Linn. Syst. Nat.* i, p. 406; *Day, Fish. India*, p. 690, pl. clxxviii, fig. 3 (see synon.).

D. 3 | 24–25. P. 14. A. 21–22. C. 12. L. l. 38–40. L. tr. 22.

Length of head $3\frac{1}{4}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—5 diameters from end of snout and $1\frac{1}{3}$ apart. No groove in front of eye. *Teeth*—compressed, notched, those in middle of lower jaw longer than those in upper. *Fins*—ventral spine movable. Caudal rounded in young, undulated in adult. *Scales*—entirely cover cheeks; some osseous scutes behind gill-opening. Two and a half rows of recurved spines on side of tail. *Colour*—greyish, with a large dark blotch along side of body extending to anal fin. Four dark blue interocular bands divided by three black ones; three blue lines from eye to base of pectoral, the first two separated by a black band, an orange band from angle of mouth to same place; four or five oblique white bands from middle of body to anal fin; caudal spines black and situated on a white base.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond.

1383. (12.) Balistes rectangulus.

Balistes rectangulus, *Bl. Schn. Syst. Ich.* p. 465; *Day, Fish. India*, p. 691, pl. clxxviii, fig. 2 (see synon.).

D. 3 | 23. P. 14. A. 20–22. C. 12. L. l. 42. L. tr. 24–28.

Length of head 3, height of body $2\frac{3}{4}$ in the total length. *Eyes*—5 diameters from end of snout and 2 apart. No groove in front of eye. *Teeth*—compressed and notched. *Fins*—dorsal spine strong, and $\frac{2}{5}$ length of head. Ventral spine movable. Caudal slightly rounded or cut nearly square. *Scales*—entirely cover cheeks; some osseous plates behind gill-opening; $3\frac{1}{2}$ rows of recurved spines on either side of tail. *Colour*—olive, a blue-edged black band passes from below eye to gill-opening and widening is con-

tinued to vent and anterior two thirds of base of anal fin; in front of this band a yellow one, also having a blue outer edge, runs from eye to anterior portion of base of pectoral, another narrow blue-edged black band from behind gill-opening towards end of soft dorsal; a black angular band edged with blue, the angle pointing forwards, on free portion of tail. Three very narrow black interocular bands, dividing four wider blue ones. A light blue band edged with black across tho snout; fins light-coloured, first dorsal bluish, with a light edge, which has a narrow brown base and a black outer margin; pectoral with a black base.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1384. (13.) Balistes undulatus.

Balistes undulatus, *Mungo Park, Trans. Linn. Soc.* iii, p. 37; *Day Fish. India,* p. 691, pl. clxxvii, fig. 4 (see synon.).

Mol-kotah, "Rice pounder," Singhalese.

D. 3 | 25–26. P. 14. A. 22. C. 12. L. l. 40. L. tr. 23–26.

Length of head $3\frac{3}{4}$, height of body $2\frac{1}{3}$ in the total length. *Eyes*—high up and not above $\frac{1}{2}$ diameter from posterior end of head, $1\frac{1}{2}$ diam. apart. No groove in front of eye. *Fins*—second dorsal and anal fins rather low, the corners rounded. Ventral spine movable. Posterior edge of caudal fin convex or undulated. *Scales*—cheeks entirely scaly; a patch of a few enlarged scutes behind gill-opening; 4 to 6 strong spines on either side of the tail in two rows. *Colour*—brownish, with numerous curved yellow lines from eye and back to anal and caudal fins; three or four from angle of mouth and lips to between ventral and anal fins; a dark band along base of second dorsal and anal; and a black margin to interspinous membrane between first and second dorsal spines. In some examples a black blotch exists at side of tail near base of caudal fin.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

1385. (14.) Balistes buniva.

Balistes buniva, *Lacép. H. N. Poiss.* v, p. 669, pl. xxi, fig. 1; *Day, Fish. India, Suppl.* 1888, p. 808 (see synon.).

D. 2–3 | 31–33. P. 15. A. 28–30. L. l. 53 (65, Bleeker).

Length of head 4, height of body nearly 2 in the total length. *Eyes*—5 diameters in length of head, $3\frac{1}{2}$ from end of snout. A groove before eye. *Teeth*—white, even, and incisor-like. *Fins*—first spine of dorsal fin very strong; caudal posteriorly with an S-shaped outline, in old specimens the lobes are slightly produced. *Scales*—enlarged osseous plates behind gill-opening. Seven or

eight raised spiny lines on side of tail. *Colour*—black, with a raised white line along bases of second dorsal and anal fins.

Hab. Tropical parts of Atlantic, Indian, and Pacific Oceans. This fish has been captured in Ceylon (*Haly*), where it appears to be common.

1386. (15.) Balistes erythrodon.

Balistes erythrodon, *Günther, Catal.* viii, p. 228; *Day, Fish. India*, p. 692, pl. clxxv, fig. 4 (see synon.).

D. 3 | 35. P. 14. A. 30. C. 12. L. l. 33–35. L. tr. 17.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—3 diameters from end of snout and $1\frac{1}{2}$ apart. A shallow scaly groove in front of eye. Lower jaw projecting. *Teeth*—reddish brown, strongly compressed, notched; tooth on each side of central pair in upper jaw considerably projecting. *Fins*—caudal deeply concave, with its outer rays prolonged. Second dorsal and anal elevated, especially anteriorly. *Scales*—cheeks entirely scaly; some enlarged scutes behind gill-opening. Scales roughened, those along middle of body and tail with a small elevated tubercle on each, but no prominent spines. *Colour*—deep brown, a black stripe after encircling the mouth goes to base of pectoral. Vertical fins nearly black, the caudal with a white posterior edge.

Hab. Red Sea, east coast of Africa, seas of India, to the Malay Archipelago.

3. Genus **MONACANTHUS**, Cuvier.

Syn. *Alutarius*, Cuv.; *Stephanolepis*, Gill; *Chætodermis*, *Paramonacanthus*, *Amanses*, Gray; *Pseudomonacanthus*, *Lomonacanthus*, *Oxymonacanthus*, *Branchaluteres*, *Acanthaluteres*, *Ceratacanthus*, *Paraluteres*, *Pseudaluteres*, and *Alutcres*, Bleeker.

Body compressed. No barbels. Incisor-like teeth in both jaws, in two rows in the upper with six in the outer row, and a single row of six in the mandibles. First dorsal fin composed of a spine which may be feeble or strong, occasionally a second rudimentary one; ventral fin, when present, reduced to a single osseous process, movable or fixed. Scales minute and rough. Vertebræ 7/11–14.

Geographical Distribution. Tropical and subtropical seas.

Synopsis of Indian Species.

A. Dorsal spine with 2 rows of barbs.
  a. Profile from snout to first dorsal almost straight.
    Dorsal spine from highest point of back .... 1. *M. setifer*, p. 481.
    Origin of second dorsal as high as base of spine .... 2. *M. chœrocephalus*, p. 481.

b. Profile from snout to first dorsal concave..........................	3. *M. tormentosus*, p. 482.
B. Dorsal spine not barbed.	
Height of body about $\frac{1}{3}$ total length..	4. *M. monoceros*, p. 482.
Height of body less than $\frac{1}{4}$ total length	5. *M. scriptus*, p. 483.

1387. (1.) Monacanthus setifer.

Monacanthus setifer, *Bennett, P. Z. S.* 1831, p. 112; *Day, Fish. India*, p. 692 (see synon.).

B. vi. D. 1 | 28–34. P. 12. A. 29–33. C. 9.

Length of head $3\frac{1}{4}$ to $3\frac{2}{3}$, of caudal fin $4\frac{1}{2}$, height of body $2\frac{1}{3}$ to $2\frac{2}{3}$ in the total length. *Eyes*—in posterior half of head, 2 to $2\frac{1}{4}$ diameters from end of snout. *Fins*—the first dorsal at highest point of dorsal profile; the spine may be strong or weak, prolonged or not. Anterior ray of second dorsal occasionally with a filamentous prolongation. Ventral spine small, movable, attached to abdominal membrane. Caudal rounded. *Scales*—present but small, the skin velvety. *Colour*—dull brown, with dark blotches and streaks; caudal fin with two dark vertical bands.

Hab. East coast of Africa, seas of India, China, and Japan; also tropical and subtropical Atlantic.

Fig. 172.—*Monacanthus chœrocephalus.*

1388. (2.) Monacanthus chœrocephalus. (Fig. 172.)

Monacanthus choirocephalus, *Bleeker*, *Batav. Genootsch. Verhand.* xxiv, *Balist.* p. 19, pl. ii, fig. 4; *Day, Fish. India*, p. 693, pl. clxxix, fig. 3 (see synon.).

B. vi. D. 1 | 28. P. 13. A. 28–30. C. 12.

Length of head $3\frac{1}{2}$, of caudal fin 5, height of body $2\frac{2}{3}$ in the total length. *Eyes*—in posterior half of head; $2\frac{1}{4}$ diam. from end of snout and 1 apart. Profile from snout to first dorsal fin almost straight. Origin of second dorsal at nearly highest point of dorsal profile. *Fins*—dorsal spine rather weak, rough anteriorly, and with a row of small barbs on either side of its posterior surface. Ventral spine movable. Caudal rounded, sometimes a setiform prolongation of one of its upper rays. *Scales*—indistinctly visible, skin not very rough; numerous small fleshy tentacles on sides of body. *Colour*—grey stone, with irregular and rather large black blotches; two dark bands across caudal fin.

Hab. Madras (not rare) to the Malay Archipelago.

1389. (3.) Monacanthus tomentosus.

Balistes tomentosus, *Linn. Syst. Nat.* i, p. 405.
Monacanthus tormentosus, *Day, Fish. India, Suppl.* 1888, p. 803 (see synon.).

B. vi. D. 1 | 26–29. P. 11. A. 25–27. C. 10.

Length of head 4, of caudal fin $5\frac{1}{4}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—high up in posterior half of head over gill-opening, and 2 diam. from end of snout. Profile from snout to first dorsal somewhat concave. *Fins*—dorsal spine strong, about as long as head, armed posteriorly with a double row of recurved spines. Ventral spine movable, with small curved spines posteriorly, second dorsal and anal fins low; caudal rounded. *Scales*—small, each with 4 or 5 marginal spines; the male on either side of the tail has a long patch of short setiform spines, sometimes wanting in the female. Some short fleshy tentacles on side of body. *Colour*—brown, spotted and marbled with black, a light band along anterior half of body. Caudal fin with two dark vertical bands.

Hab. Obtained by Mr. Haly at Karativoe, Ceylon; found also in the Malay Archipelago, Chinese and Australian seas.

1390. (4.) Monacanthus monoceros.

Balistes monoceros, *Linn. Syst. Nat.* i, p. 404.
Monacanthus monoceros, *Day, Fish. India,* p. 693, pl. clxxix, fig. 2 (see synon.).

B. vi. D. 1 | 46–48. P. 14. A. 48–53. C. 12.

Length of head about 4, of caudal fin 8, height of body from $2\frac{3}{4}$ to $3\frac{1}{3}$ in the total length. *Eyes*—rather small, situated between upper end of gill-opening and dorsal spine. Body oblong; snout moderately produced, with its upper profile convex. *Fins*—vertical ones low; dorsal spine weak. No ventral spine. Caudal truncated or very slightly convex. *Colour*—brownish or blackish, the fins yellow.

Hab. Seas of India, Indian Ocean generally, and Japan; Atlantic off tropical America. An example in the Madras Museum is 15 inches in length.

1391. (5.) Monacanthus scriptus.

Balistes scriptus, *Osbeck's Voyage, transl. by Forster*, i, p. 174.
Monacanthus scriptus, *Day, Fish. India*, p. 694, pl. clxxvi, fig. 3 (see synon.).

B. vi. D. 1 | 44–48. P. 15. A. 47–52. C. 12.

Length of head 4 to $4\frac{1}{4}$, of caudal fin $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—of moderate size, situated between upper end of gill-opening and first dorsal. Body oblong; snout produced, its upper profile concave. *Fins*—vertical ones low, dorsal spine weak. No ventral spine. Caudal wedge-shaped. *Colour*—buff, covered with small brown spots and blue lines.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least two feet in length.

4. Genus **ANACANTHUS**, Gray.

Syn. *Psilocephalus*, Swainson; *Pogonognathus*, Bleeker.

Body compressed, elongate. A fleshy barbel below the symphysis of the lower jaw. Incisor-like teeth in both jaws, in two rows in the upper and one row in the lower jaw. First dorsal in the form of a single flexible spine; the second and the anal with many rays; ventral absent. Body covered with fine asperities. Vertebræ 29–30.

Geographical Distribution. Seas of India to the Malay Archipelago, and beyond.

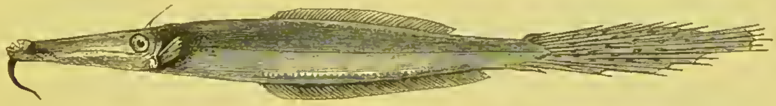

Fig. 173.—*Anacanthus barbatus.*

1392. (1.) Anacanthus barbatus. (Fig. 173.)

Balistes (Anacanthus) barbatus, *Gray & Hardw. Ill. Ind. Zool.* i. pl. 84, fig. 2 (male).
Anacanthus barbatus, *Day, Fish. India*, p. 694, pl. clxxix, fig. 1 (female) (see synon.).

Crassi kola and *Watamoo kola*, Tamil.

B. iii. D. 1 | 49–52. P. 10. A. 57–64. C. 12.

Length of head about $\frac{1}{3}$ of that of body excluding caudal fin.

Eyes—high up, behind and above gill-opening. Body strongly compressed: a fleshy barbel below symphysis of lower jaw. In the *male* there is a skinny prolongation from throat continued nearly as far as anal and supported by a prolongation of the pelvic bone. *Fins*—second dorsal and anal low; caudal wedge-shaped, its central rays the longest. *Colour*—dull brown or grey, fins yellow, caudal with about six vertical or angular dark bands not so wide as ground-colour.

Hab. Seas of India to the Malay Archipelago. This fish is very common at Madras, especially the young, and attains at least 10 inches in length.

Third group. OSTRACIONTINA.

5. Genus **OSTRACION**, Linnæus.

Syn. *Lætophrys*, *Tetrosomus*, and *Rhinesomus*, Swains.; *Acanthostracion*, Bleeker; *Cibotion*, Kaup.

Branchiostegals six. Body shortened and angular, with the integuments modified into a solid carapace composed of angular osseous plates in juxtaposition with one another, but leaving the snout, bases of the fins, and the hind portion of the tail covered by soft skin. The carapace three- to five-ridged, and closed behind the anal fin. Mouth small; premaxillaries and maxillaries coalescent. Teeth slender and in one row. A single spineless dorsal fin opposite the anal. Ventrals absent.

The spines observed on some of the species vary with the age of the individual.

Geographical Distribution. Tropical and subtropical seas.

Synopsis of Indian Species.

A. Carapace 3-ridged, armed with spines . . 1. *O. turritus*, p. 484.
B. Carapace 4-ridged, spineless.
  Brownish, with small blue black-edged ocelli . . . . 2. *O. cubicus*, p. 485.
  Reddish brown, with numerous small white spots . . . . 3. *O. punctatus*, p. 486.
C. Carapace 5-ridged, spineless . . . . 4. *O. nasus*, p. 486.
D. Carapace 4-ridged, and furnished with spines . . . . 5. *O. cornutus*, p. 486.

1393. (1.) **Ostracion turritus.** (Fig. 174.)

Ostracion turritus, *Forsk. Descr. Anim.* p. 75, no. 113; *Day, Fish. India*, p. 695, pl. clxxxi, fig. 4 (see synon.).

Cul-planchee, Tamil.

D. 9. P. 10. A. 9. C. 10.

Carapace 3-ridged, the upper or dorsal ridge elevated and compressed into a sharp triangular spine. Each lateral or ventral ridge well developed, and armed with 4 triangular, flattened, strong

spines directed backwards. Body about as wide as high. A compressed supraorbital spine. *Fins*—caudal rounded or truncated. *Scutes*—9 to 11 from gill-opening to tail, 9 or 10 transversely; about 11 across ventral surface. *Colour*—olive-brown, with 3 badly marked

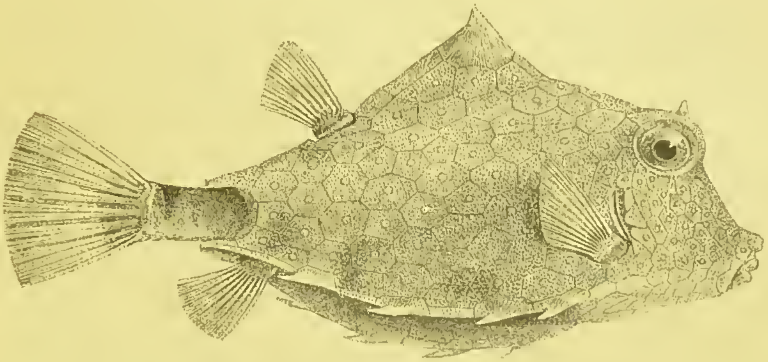

Fig. 174.—*Ostracion turritus.*

dark bands in lower $\frac{1}{3}$ of body, and a fourth just behind base of dorsal fin. A light blue spot in centre of each scute. Fins straw-coloured, the caudal with two dark vertical bands, one at the base, the other at the end. The young have several dark blotches and bands on various parts of the body, and a ridge extends from orbit to upper part of bridge over tail.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and reported from New York. This fish attains at least 9 inches in length.

1394. (2.) **Ostracion cubicus.**

Ostracion cubicus, *Linn. Syst. Nat.* i, p. 410; *Day, Fish. India,* p. 696, pl. clxxxi, fig. 3 (see synon.).

D. 10. P. 10. A. 10. C. 10.

Carapace 4-ridged and spineless; ridges blunt. Body about as wide as high; back convex. Interorbital space concave. *Fins*—caudal truncated and about $\frac{1}{5}$ of total length. *Scutes*—about 10 between gill-opening and tail, 5 or 6 transversely; and 5 or 6 across ventral surface. *Colour*—brownish, a single blue black-edged ocellus in the centre of most of the scutes; sometimes the spots are absent from parts of the body; on the head they are frequently black, and have more than one spot on each scute. On the abdomen the spots may be white, with or without black marks, or black. Fins yellowish, and covered with black spots or immaculate.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least 18 inches in length.

1395. (3.) Ostracion punctatus.

Ostracion punctatus, *Bl. Schn. Syst. Ich.* p. 501; *Day, Fish. India,* p. 696, pl. clxxxi, fig 2 (see synon.).

D. 9. P. 10. A. 10. C. 10.

Carapace 4-ridged and spineless; ridges blunt. Body not quite so high as wide; back rather convex. Interorbital space concave, sometimes flat. *Fins*—caudal truncated and nearly $\frac{1}{5}$ of total length. *Scutes*—about 10 across ventral surface. *Colour*—reddish brown, covered with numerous white dots, sometimes confluent into lines.

Hab. East coast of Africa, seas of India, Malay Archipelago, and beyond.

1396. (4.) Ostracion nasus.

Ostracion nasus, *Bloch, Ausl. Fische,* i, p. 118, t. 138; *Day, Fish. India,* p. 696 (see synon.).

D. 9. P. 10. A. 9. C. 10.

Carapace 5-ridged and spineless; ridges rather sharp. Body wider inferiorly than high; a distinct ridge along median line of back. Interorbital space concave, more especially in adults, in which a hump exists above mouth. *Fins*—caudal rounded, about $\frac{1}{5}$ of total length. *Scutes*—11 or 12 between branchial opening and base of caudal fin; 6 or 7 transversely; 7 or 8 across ventral surface. *Colour*—greenish yellow, with small irregularly scattered round black spots, or one in the centre or at the side of each scute; abdomen whitish; black spots on tail and caudal fin. The young are bright orange-yellow, with numerous black spots along sides, not situated in centre of scutes, some black spots also exist over the caudal fin and on base of pectorals; fins yellowish, abdominal surface whitish yellow. Pupil golden.

Hab. Seas of India to Malay Archipelago and Pacific. I procured two young ones at Cochin, but have not obtained the adult. This species attains to at least $8\frac{1}{2}$ inches in length.

1397. (5.) Ostracion cornutus.

Ostracion cornutus, *Linn. Syst. Nat.* i, p. 409; *Day, Fish. India,* p. 697, pl. clxxvi, fig. 4 (see synon.).

Martoo-plachee, Tamil; *Nga noá,* "ox-fish," Burmese.

D. 9. P. 11. A. 9. C. 10.

Carapace 4-ridged. Two long anteriorly directed and conical supraorbital spines; each ventral ridge terminates posteriorly in another somewhat similar one. Dorsal ridge rather elevated about the middle. Interorbital space very concave. *Fins*—caudal truncated, about $\frac{1}{2}$ total length. *Scutes*—about 10 between gill-opening and tail, 5 or 6 transversely; and 7 across ventral surface.

Colour—carapace light brown, with round bluo spots all over it in moderate numbers, about one to eaeh seute; some seutes, however, without spots. Caudal blue-spotted.

Hab. Red Sea, east coast of Afriea, seas of India, Malay Archipelago, and beyond.

Family II. GYMNODONTES.

Body more or less short. Bones of the upper and lower jaw in the form of a beak, having a eutting-edge, and covered with a layer of ivory-like substanee; a median suture present in some. A spineless dorsal, anal, and caudal; pectorals present; ventrals absent. Dermal covering modified into small or large spines or laminæ. Pelvie bones and air-bladder present or absent.

Some *Gymnodontes* possess the means of dilating an elastie portion of the œsophagus, or an abdominal sae, with air. Most of the Indian fishes of this family are highly indigestible or even virulently poisonous.

Synopsis of Indian Genera.

First group. TRIODONTINA.

Tail well developed. Abdomen dilatable into a large compressed sac supported by an elongate pelvic bone.

Upper jaw divided by a median suture, lower entire .... 1. TRIODON.

Seeond group. TETRODONTINA.

Tail well developed. A portion of the œsophagus dilatable.

A. Both jaws with a median suture.
  Dorsal and anal fins with many rays (23–28) .. 2. XENOPTERUS.
  Dorsal and anal fins with few rays (8–16) .... 3. TETRODON.
B. Both jaws entire .... 4. DIODON.

Third group. MOLINA.

Tail very short, truncated. Vertical fins confluent. Body short and compressed.

Jaws without median suture .... 5. ORTHAGORISCUS.

First group. TRIODONTINA.

1. Genus TRIODON (Reinw.), Cuvier.

The upper jaw with, the lower without, a median suture. Two

separate nasal orifices on either side. Tail elongate, terminating in a bilobed fin; dorsal and anal with few rays. Abdomen possessing a large sac, the upper portion of which can be dilated with air, and kept distended by elongate pelvic bones. The dermal covering consisting of spiny osseous laminæ, which are not imbricate. Air-bladder present.

1398. (1.) Triodon bursarius.

Triodon bursarius (*Reinw.*), *Cuv. Règn. Anim.* 2e éd. 1829, ii, p. 370; *Day, Fish. India*, p. 698 (see synon.).

B. vi. D. 10–11. P. 15–16. A. 9–10. C. 18.

Length of head 4 to 4½, of caudal fin 7 in the total length. *Eyes*—situated in posterior half of head. Interorbital space rather concave. *Fins*—dorsal slightly in advance of anal; caudal emarginate. *Colour*—dull brown, a large, irregularly shaped, black yellow- or blue-edged spot present on upper portion of sac. Fins yellow.

Hab. Seas of India to the Malay Archipelago; attaining at least 21 inches in length.

Second group. TETRODONTINA.

2. Genus XENOPTERUS (Bibron), Duméril.

Syn. *Chonerhinus*, Bleeker.

Back rounded; both jaws divided by a median suture. Nostrils funnel-shaped with fringed margins. Dorsal and anal fins with many rays (23 to 38). Part of the body covered with fine dermal spines, having double or treble roots.

These fishes and the *Tetrodons* are able to inflate their bodies with air and float on the water, abdomen uppermost. They ascend large rivers, far above tidal influence.

1399. (1.) Xenopterus naritus. (Fig. 175.)

Tetraodon naritus, *Richardson, Voy. 'Samarang,' Fish.* p. 18, pl. viii.
Xenopterus naritus, *Day, Fish. India*, p. 699, pl. clxxxii, fig. 1 (see synon.).

Nga boodèn, Burmese.

B. v. D. 32–38. P. 19. A. 28–32. C. 12.

Eyes—rather small; interorbital space broad and flat. Lips thick and fringed. *Fins*—caudal slightly emarginate. *Spines*—rather widely separated, situated between eye and base of pectoral fin, above which they are continued a short distance; also for a short distance behind that fin and along the abdominal surface

nearly as far as the vent. *Colour*—pale yellow, darkest along the back and in the lower two thirds of the dorsal fin.

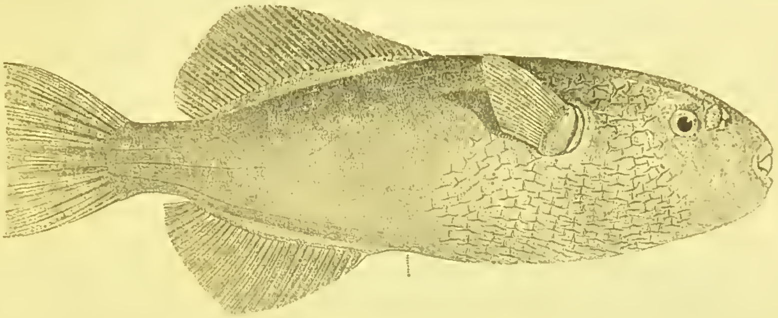

Fig. 175.—*Xenopterus naritus.*

Hab. Through the rivers, estuaries, and coasts of Burma to the Malay Archipelago.

3. Genus **TETRODON**, Linnæus.

Syn. *Leisomus, Lagocephalus, Cirrhisomus*, and *Psilonotus*, Swainson; *Holacanthus*, Gray; *Prilonotus* and *Anchisomus*, Kaup; *Tropidichthys*, Bleeker; *Rhynchotus, Apsicephalus, Brachycephalus*, Hollard.

Kappa, Tel.; *Plachee*, Tam.; *Kuddul mah-cutchee*, or "Sea-frogs," Mal. Globe or puff fishes.

Back broad, or compressed into a ridge. Both jaws with a median suture. Dorsal and anal fins with few rays. Body wholly or partially covered with fine dermal spines, or spines may be absent. A portion of the œsophagus dilatable and capable of being distended with air. Air-bladder present and horseshoe-shaped.

Some species of *Tetrodon* are poisonous, but there is much variation in this respect and some Burmese and Andamanese eat particular kinds.

Geographical Distribution. Tropical and subtropical seas, entering estuaries. A few are found in fresh waters.

Synopsis of Indian Species.

A. Back broad, not compressed; nasal organs conspicuous.
- *a.* Two nasal openings on each side of snout, each pair in a prominent papilla.
  - *a'.* No spines on back .... 1. *T. inermis*, p. 490.
  - *b'.* Spines on back.
    - *a''.* Greenish olive above, unspotted. 2. *T. lunaris*, p. 491.
    - *b''.* Olive-green above with brown spots .... 3. *T. sceleratus*, p. 491.

c''. Yellowish brown above, with light spots.	
Eye nearer to gill-opening than to snout	4. *T. hypselogenion*, p. 492.
Eye equidistant from gill-opening and snout	5. *T. oblongus*, p. 492.
b. A single imperforate nasal cavity on each side with a fringed edge; body spiny	6. *T. patoca*, p. 492.
c. A simple circular nasal cavity; body spineless	7. *T. cutcutia*, p. 493.
d. On each side two solid nasal tentacles and an impervious nasal fossa.	
a'. Body spiny throughout.	
No spots on body, sides sometimes banded	8. *T. immaculatus*, p. 493.
Usually scattered black spots. Caudal fin unspotted	9. *T. nigropunctatus*, p. 494.
Brownish above with close dark spots. Caudal spotted	10. *T. stellatus*, p. 494.
Dark with white spots above, banded below. Caudal spotted.	11. *T. reticularis*, p. 494.
Dark with a few pale spots above. Caudal unspotted............	12. *T. hispidus*, p. 495.
b'. Back and abdomen spiny, sides spineless.	
D. 11, A. 8–9. Back with white spots	13. *T. leopardus*, p. 495.
D. 12, A. 11. Back with green spots and bars	14. *T. viridipunctatus*, p. 496.
D. 14–16, A. 12–13. Back and sides with large black blotches.	15. *T. fluviatilis*, p. 496.
B. Back compressed into a keel, nasal organs inconspicuous	16. *T. margaritatus*, p. 497.

1400. (1.) Tetrodon inermis.

Tetrodon inermis, *Temm. & Schleg. Faun. Japon., Poiss.* p. 278, t. cxxii, fig. 2; *Day, Fish. India*, p. 701, pl. clxxx, fig 1.

B. v. D. 12–13. P. 19. A. 11. C. 10.

Two nasal openings on each side. *Eyes*—rather large, situated nearer to gill-opening than to end of snout, and $1\frac{1}{3}$ diameters apart. *Fins*—dorsal with its anterior rays the longest, its height rather above twice the length of its base; anal similar. Caudal emarginate. *Spines*—soft and widely separated, only existing along the abdominal surface, not extending so far as the vent. A moderately well-marked fold of skin along side of tail. Skin on summit of head with short longitudinal rugæ. *Colour*—upper surface of head and back plumbaceous; a broad dull brown band from the eye nearly to the tail, beneath silvery white. Gill-opening black internally; dorsal fin dark in its upper two thirds; caudal dark in its last half, margined with white.

Hab. Seas of India to Japan.

1401. (2.) **Tetrodon lunaris.** (Fig. 176.)

Tetrodon lunaris, *Bl. Schn. Syst. Ich.* p. 505; *Day, Fish. India*, p. 701, pl. clxxxii, fig. 2 (see synon.).

Kappa koorawah, Tel.; *Cha-mo-dah*, Andamanese.

B. v. D. 12–14. P. 16–19. A. 11–12. C. 10.

Two nostrils on each side of snout. *Eyes*—rather large, situated much nearer to gill-opening than to end of snout and 1½ diam. apart; interorbital space flat. *Fins*—dorsal with its anterior rays the longest; anal similar to dorsal. Caudal emarginate. *Spines*—

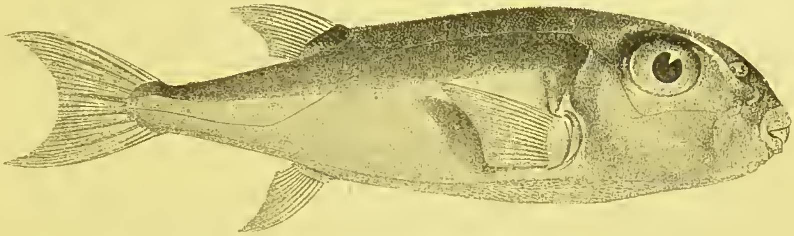

Fig. 176.—*Tetrodon lunaris.*

small, either entirely covering back, or only anteriorly from opposite front margin of eyes; abdomen similarly protected. *Colour*—Greenish olive above, sides and abdomen satin-white, a yellowish line from eye to middle of caudal fin; end of caudal dark with a light outer edge.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least a foot in length. The fry are common in the Hooghly.

1402. (3.) **Tetrodon sceleratus.**

Tetrodon sceleratus (*Forster*), *Gmel. Syst. Nat.* i, p. 1444; *Day, Fish. India*, p. 701 (see synon.).

B. v. D. 10–12. P. 16–17. A. 9–11. C. 11.

Length of head equals about ⅔ of its distance from base of dorsal fin; two nostrils on each side. *Eyes*—nearly two diameters from end of snout. Tail depressed. *Fins*—caudal fin emarginate, $\frac{1}{6}$ to $\frac{1}{7}$ of total length. *Spines*—head and back with fine spines, none on sides, but some with three roots along abdominal surface to behind base of anal. *Colour*—olive-green above, with some brown spots; whitish laterally and below, with a silvery longitudinal band; a triangular white spot in front of eye; a brown band round mandibles, sometimes continued along side below silvery lateral band; gill-openings black.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least 2½ feet in length.

1403. (4.) Tetrodon hypselogenion.

Tetrodon hypselogenion, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 300; *Day, Fish. India,* p. 702, pl. clxxxiii, fig. 5 (see synon.).

B. v. D. 8–9. P. 16. A. 8. C. 10.

Two nostrils on each side. *Eyes*—situated rather behind middle of length of head. Osseous interorbital space very much narrower than shortest diameter of eye. *Fins*—base of dorsal only $\frac{2}{5}$ of its height, the anterior rays highest; anal similar. Caudal slightly emarginate, length $4\frac{1}{2}$ in total. *Spines*—of moderate size and rather widely separated, they commence on the dorsal profile a slight distance behind eyes and are continued half the distance to base of dorsal fin or more; also along abdominal surface almost to vent; some are present on sides behind pectoral fin. *Colour*—yellowish brown, white stained with yellow beneath; colour of back often sharply defined from white of sides; whole upper surface covered with light dots, which have usually dark edges; from three to five vertical bars under eye. Caudal with about seven vertical bands, most distinct in the upper lobe.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Australia; attaining about six inches in length.

1404. (5.) Tetrodon oblongus.

Tetrodon oblongus, *Bloch, Ausl. Fische,* ii. p. 6, t. 146, fig. 1; *Day, Fish. India,* p. 702, pl. clxxxii, fig. 3 (see synon.).

D. 12. P. 17. A. 10. C. 10.

Two nostrils on each side. *Eyes*—small in adults; interorbital space nearly flat and very broad in adults, in which it exceeds length of snout. *Teeth*—lower a little larger than upper pair. *Fins*—middle dorsal ray somewhat the highest, twice as long as base of fin; anal similar to dorsal. Caudal truncated. *Spines*—with two roots, present on back from nostrils to dorsal fin; a few on lower part of cheeks and many along abdominal surface almost as far as vent. *Colour*—light brownish along back, white tinged with yellow on sides and beneath. Bands of dark brown from back down sides to middle of body enclosing light spaces of irregular size and shape or round spots. From snout to dorsal fin round or oval light spots predominate. Fins yellow stained with orange, sometimes a black shoulder-spot.

Hab. Seas of India, Malay Archipelago, China, Japan, and the South Sea.

1405. (6.) Tetrodon patoca.

Tetrodon patoca, *Ham. Buch. Fish. Ganges,* pp. 7, 362, pl. xviii, fig. 2; *Day, Fish. India,* p. 703, pl. clxxxii, fig. 4 (see synon.).

Bheng pulli, Ooriah; *Boga,* Chittagong; *Nga booden,* Burmese.

D. 10–11. P. 18. A. 8–10. C. 10–11.

A single fringed imperforate nasal cavity on each side of snout; interorbital space broad. *Fins*—dorsal and anal rounded, the caudal fin (which is contained from 4½ to 5½ times in the total length) truncated. *Spines*—small, with three or four roots, extending from a short distance behind nostrils to base of dorsal fin; beneath they cover the chest nearly as high as base of pectoral and extend to vent. *Colour*—upper half brown or black, with numerous round or oval white spots; sides and abdomen silvery, a yellowish tinge dividing dark back from white side. Caudal in young stained dark in outer half. In some, especially marine forms and immature specimens, two or three distinct dark bands descend from back to middle of sides, and a fourth passes across head.

Hab. From Sind through the seas of India to China, attaining at least 13 inches in length. Very common along the Coromandel coast.

1406. (7.) Tetrodon cutcutia.

Tetrodon cutcutia, *Ham. Buch. Fish. Ganges*, pp. 8, 362, pl. xviii, fig. 3; *Day, Fish. India*, p. 703, pl. clxxxii, fig. 5 (see synon.).

Teepah bengti, Ooriah.

B. v. D. 10–11. P. 21. A. 10. C. 7.

Caudal fin 6 in total length; interorbital space flat and broad. Nostril a single orifice, situated in a very short simple tube. *Fins*—all rounded. *Spines*—entirely absent. *Colour*—greenish yellow above, white on abdomen. A light band from eye to eye. A large black ocellus, surrounded by a light edge, on side. The whole back marked with dark greenish reticulations enclosing lighter spaces; fins greyish; caudal tipped with carmine; a red spot on throat.

Hab. Fresh waters of Orissa, Bengal, and Assam; attaining about 3½ inches in length.

1407. (8.) Tetrodon immaculatus.

Tetrodon immaculatus, *Bl. Schn. Syst. Ich.* p. 507; *Day, Fish. India*, p. 703, pl. clxxxiii, fig. 4 (see synon.).

D. 9–10. P. 17–18. A. 8–10. C. 9–10.

Two nasal tentacles on each side, an impervious nasal fossa between each two. Interorbital space broad and flat. *Fins*—rounded, height of dorsal equals about ½ length of head. Caudal rather elongate, ¼ total length. *Spines*—small, covering body except snout and posterior half of tail. *Colour*—greenish above, brownish along middle of side, and dirty white below; upper and lower edges as well as end of caudal black. In some there is a white spot over eye; occasionally there are several parallel greyish longitudinal bands on sides. In some examples all spines are white.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least 12 inches in length.

1408. (9.) Tetrodon nigropunctatus.

Tetrodon nigropunctatus, *Bl. Schn. Syst. Ich.* p. 507; *Day, Fish. India*, p. 740, pl. clxxx, fig. 4 (see synon.).

B. v. D. 10. P. 18. A. 9. C. 9.

Two nasal tentacles on each side. *Eyes*—rather small, about 2 diameters from end of snout and about 3 apart; interorbital space nearly flat, osseous portion less than two diameters of eye wide. *Fins*—dorsal situated in the last fourth of the body excluding caudal fin; it and anal rounded. Caudal rounded and about $\frac{1}{5}$ of total length. *Spines*—small, and usually covering the entire body; the extent over which they extend varies, and they appear to be absent in some examples. *Colour*—brown above, becoming lighter on sides and beneath; some scattered black dots over the body, and the vent in a black spot; snout and round mouth black or very dark brown; the spots sometimes wanting. In one variety termed *citrinella* the entire body is of a beautiful lemon-colour with black spots.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; attaining at least to 9 inches in length.

1409. (10.) Tetrodon stellatus.

Tetrodon stellatus, *Bl. Schn. Syst. Ich.* p. 503; *Day, Fish. India*, p. 705, pl. clxxxiii, fig. 3 (see synon.).

B. v. D. 11. P. 18–21. A. 11–12. C. 11.

Two nasal tentacles on each side. *Eyes*—rather above two diameters from end of snout, and $2\frac{1}{2}$ apart; interorbital space nearly flat, and osseous portion extending the whole distance. *Fins*—dorsal situated in last $\frac{1}{4}$ of length excluding caudal fin, which is rounded and about $\frac{1}{6}$ of total length. *Spines*—small, extended all over body. *Colour*—generally brownish yellow along back; the whole back and sides to below pectoral covered with brown spots divided by yellowish-white lines above, but further apart lower down. Caudal spotted; dorsal and anal dark; pectoral yellowish, often with a black base beneath; anus in a black ring; lower lip black, yellow at the angle.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond; attaining at least two feet in length.

1410. (11.) Tetrodon reticularis.

Tetrodon reticularis, *Bl. Schn. Syst. Ich.* p. 506; *Day, Fish. India*, p. 705, pl. clxxx, fig. 5 (see synon.).

Paatha, Mal.; *Ko-pud-dah*, Andamanese.

D. 10–11. P. 19. A. 10–11. C. 10–11. Vert. 8/10.

Two nasal tentacles on each side. Interorbital space broad and flat. *Fins*—rounded, dorsal situated in last fourth of length excluding caudal fin; height of dorsal somewhat exceeds half length of head. Caudal fin $4\frac{1}{2}$ in total length. *Spines*—small, covering entire body except fore part of snout. *Colour*—deep grey or brown above, white below; 8 to 10 longitudinal black stripes, which are curved under the eye, as well as round the mouth and pectoral fin; on the back are round whitish spots; caudal reticulated with black on a white ground. In the young bands on cheek are wanting.

Hab. Seas of India, Malay Archipelago, and New Guinea; attaining at least 17 inches in length.

1411. (12.) Tetrodon hispidus.

Tetrodon hispidus, *Bloch, Ausl. Fische*, i, p. 130, t. 142; *Day, Fish. India*, p. 706, pl. clxxxiii, fig. 2 (see synon.).

B. v. D. 10. P. 17–18. A. 10–11. C. 11.

Two nasal tentacles on each side. *Eyes*—of moderate or rather small size, from $2\frac{1}{2}$ to 3 diameters from end of snout, and 3 apart; orbit prominent and interorbital space concave. *Fins*—rounded; caudal about $\frac{1}{5}$ of total length. *Spines*—small, those on abdomen with two or three roots, they cover the body from snout to a short distance behind base of dorsal fin (in some examples they appear not to extend so far). *Colour*—brown above, with a moderate number of bluish-white spots; one or two bluish-white bands sometimes round orbit, another well-marked one round gill-opening and pectoral fin; sometimes lines or spots of black on abdomen, not ascending to cheeks; some specimens have several black blotches along either side of abdomen, or bands descending on to it.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least 20 inches in length.

1412. (13.) Tetrodon leopardus.

Tetrodon leopardus, *Day, Fish. India*, p. 706, pl. clxxx, fig. 2 (see synon.).

Bondaroo kappa, Tel.

B. v. D. 11. P. 18. A. 8–9. C. 11.

Two nasal tentacles on each side. *Eyes*—of moderate size, $1\frac{1}{2}$ diam. apart and the same from end of snout; interorbital space flat. *Fins*—dorsal highest in front, anal similar to dorsal. Caudal rounded, $4\frac{2}{3}$ in total length. *Spines*—two-rooted, widely separated along back, extending from front edge of eyes to dorsal fin; below they are closer together and reach to the vent. *Colour*—olive above, extending two thirds down sides, with an interrupted black network surrounding white spots; three black cross bands, one over head, with a V-shaped light interorbital band, posterior to it the second above pectoral, the third from base of dorsal. Reti-

culated narrow black lines enclosing large white spots on caudal and dorsal fins, the latter having likewise a narrow black basal band.

Hab. Seas of India.

1413. (14.) Tetrodon viridipunctatus.

Leiodon viridipunctatus, *Day, P. Z. S.* 1865, p. 315.
Tetrodon viridipunctatus, *Day, Fish. India,* p. 707, pl. clxxvi, fig. 5 (see synon.).

B. v. D. 12. P. 18. A. 11. C. 11.

Two nasal tentacles on each side; caudal fin 5 in total length. *Eyes*—diameter 5 in length of head, rather nearer to gill-opening than to end of snout. *Fins*—all rounded. *Spines*—two-rooted, short, some distance asunder, they commence at occiput, and extend along back two thirds of way to commencement of dorsal fin; none on sides. Inferiorly they begin below orbit, surround lower and posterior margin of pectoral fin, and are continued backwards as far as anus. *Colour*—back light green; abdomen silvery white; back and sides covered with emerald-green spots; a bar of the same colour between the eyes, from it a longitudinal band goes backwards in the median line towards a second irregular transverse band further back. Eye brown, with a golden rim surrounding the iris. Caudal and anal tipped with black; dorsal yellowish; four black spots under throat.

Hab. Cochin on the Malabar coast.

1414. (15.) Tetrodon fluviatilis.

Tetrodon fluviatilis, *Ham. Buch. Fish. Ganges,* pp. 6, 362, pl. xxx, fig. 1; *Day, Fish. India,* p. 707, pl. clxxxiii, fig. 1.

B. v. D. 14–16. P. 22. A. 12–13. C. 11.

Two nasal tentacles on each side. *Eyes*—rather large, $1\frac{1}{2}$ to 2 diam. from end of snout; interorbital space broad and slightly convex. *Fins*—caudal fin truncated, its length $\frac{1}{4}$ of total. *Spines*—with two roots, widely separated, concealed in the skin, and extending from eyes to base of dorsal fin, also over cheeks and abdomen as far as vent. *Colour*—greenish olive above, white on sides and below; back and sides with large black blotches, one or more irregular light cross bands on back, one between eyes; abdomen covered with round or angular black spots and blotches much wider than the ground-colour, sometimes it is quite black beneath; fins yellowish, end of caudal stained dark and sometimes with black spots

Hab. Seas and estuaries of India to the Malay Archipelago and beyond. This species ascends tidal rivers and in the Amherst District of Burma is said to be found in hill-streams. It attains at least $6\frac{1}{2}$ inches in length.

1415. (16.) Tetrodon margaritatus.

Tetrodon margaritatus, *Rüpp. Atl. Fische*, p. 66; *Day, Fish. India*, p. 707 (see synon.).

Karoom palasi, Tamil.

B. v. D. 9–10. P. 14–16. A. 9. C. 11.

Back compressed into a keel; nasal organs inconspicuous. *Eyes*—rather high up and in posterior half of length of head. Upper profile of snout rather concave. *Fins*—dorsal situated in almost last fourth of length excluding caudal fin, which is rather convex and contained from $4\frac{1}{2}$ to 5 times in total length. *Spines*—minute, generally covering the entire body, but occasionally wanting in caudal portion. *Colour*—dull reddish, becoming light beneath: fins yellow. The body is variously marked: in typical *T. margaritatus* there is a black blue-edged ocellus on either side of the dorsal fin; horizontal blue lines round eye and on posterior portion of body, elsewhere there are small yellow dark-edged ocelli. In the variety *T. papua* the black dorsal spot is present; the oblique bands on snout become nearly horizontal and a blue band passes to vent; also angular bands on tail; body and cheeks covered with small blue, black-edged spots. In variety *T. bennetti* a black dorsal spot also exists. Bluish vertical bands on snout, and one along middle of throat; angular bands on tail. Bluish spots on body, smallest on sides of head.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

4. Genus **DIODON**, Linnæus.

Syn. *Paradiodon*, Bleeker.

Body nearly globular. Jaws without median suture. Nasal tentacle simple, with a pair of lateral openings. Body covered with stiff and erectile dermal spines, each having a pair of lateral roots. A portion of the œsophagus dilatable, and capable of being distended with air. No pelvic bones. Air-bladder present.

Geographical Distribution. Tropical seas to the Cape of Good Hope.

In the Museum at Calcutta are two examples, without labels, of *D. spinosissimus*; and as the British Museum contains a specimen from Siam, it is not unlikely that the species is found in the seas of India. *D. novemmaculatus*, Bleeker, is also probably a visitor to India.

Synopsis of Indian Species.

Body and fins with small round spots	1. *D. hystrix*, p. 498.
Body with large black yellow-edged blotches.	2. *D. maculatus*, p. 498.

1416. (1.) Diodon hystrix. (Fig. 177.)

Diodon hystrix, *Linn. Syst. Nat.* i, p. 413; *Day, Fish. India*, p. 708, pl. clxxix, fig. 4 (see synon.).

Moollu plachay, Tamil.

Spines longest on sides of body behind pectoral fin, where they become about $\frac{3}{4}$ the length of that fin; they are dilated at their bases and usually with a pair of basal grooves. Two or three pairs

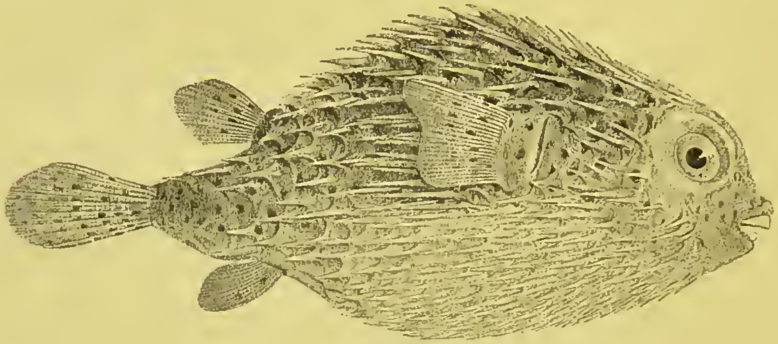

Fig. 177.—*Diodon hystrix.*

of immovable spines at upper and lower sides of the tail. *Colour*—the whole fish (except the ventral surface) light brown, covered with round blue or brown spots, rarely above one to the base of a single spine. The fins similarly spotted.

Hab. All tropical seas. This fish attains $2\frac{1}{3}$ feet in length.

1417. (2.) Diodon maculatus.

Diodon maculatus, *Günther, Catal.* viii, p. 307; *Day, Fish. India, Suppl.* 1888, p. 809 (see synon.).

B. vi. D. 2/13. P. 23. A. 2/12. C. 7.

Length of head $2\frac{2}{3}$ to $3\frac{1}{2}$ in length of body. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head. Sometimes tentacles above orbit on lower side of head, and on back. Spines of varying lengths, 16 to 19 between snout and dorsal fin; generally only two or three behind dorsal. The roots of these spines are long and strong, and have a distinct ridge along their basal portions. *Colour*—large black yellow-edged blotches on the body of various shapes, and often small black spots. The large black spots are in some cases badly defined.

Hab. Tropical seas. Found in the Gulf of Manaar by Sir W. Elliot, and in Ceylon by Haly.

Third group. MOLINA.

5. Genus **ORTHAGORISCUS**, Bl. Schn.

Syn. *Cephalus*, Shaw; *Tympanomium*, *Diplanchias*, *Trematopsis*, and *Ozodura*, Ranzani; *Ranzania*, Nardo; *Pendalion*, Guilding.

Body short and compressed, covered with a rough or else with a smooth tessellated skin, which cannot be distended with air; tail-portion of body very short and truncated. Jaws without median suture. Vertical fins confluent. Ventrals absent. No pelvic bones. No air-bladder. An accessory opercular gill.

Geographical Distribution. Cosmopolitan and pelagic.

1418. (1.) **Orthagoriscus** —— ?

A small sun-fish, *Orthagoriscus*, has been observed in Ceylon (Haly, Taprobanian, vol. ii, 1888, p. 165; Day, Fish. India, Suppl. 1888, p. 809). This may have been the widely ranging *O. mola*, or the form found at Amboina which was described and figured by Bleeker in 1873 as *O. oxyuropterus*, or possibly a nondescript species.

Subclass **LEPTOCARDII.**

Skeleton semicartilaginous and notochordal; destitute of jaws or ribs. Brain absent. Blood colourless and distributed by pulsating sinuses. Respiratory and abdominal cavities confluent; numerous branchial clefts, and the water discharged by an opening in front of the vent.

Family I. CIRROSTOMI.

An elongate compressed body, having a low and rayless dorsal fin, continued round the tail past the vent to the respiratory opening. Mouth a longitudinal slit on the interior surface, and with cirri. Eyes rudimentary. Vent near the end of the tail.

1. Genus **BRANCHIOSTOMA**, Costa.

Syn. *Amphioxus,* Yarrell.

Definition as in the family.

One or more varieties of this fish are common in the seas around India, Burma, Ceylon, and the Andaman Islands.

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